



MEASURING  
CHILD'S  
INTELLIGENCE

BY

W. TURNER

AND

K. AKBARULLAH KHAN

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## *Measuring Child's Intelligence*

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# MEASURING CHILD'S INTELLIGENCE

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## THE OPINION

Swami Ranganathananda, the illustrious personality of India, a talented scholar of high calibre, an orator of unsurpassable exuberance and the all-pervading spirit of the Rama Krishna Mission, whose message is an unction to the lacerated souls of humanity at large writes:

“The Book; what little I have read has whetted my appetite to know more and read more. Your treatment is simple, non-technical and informative; your style is easy and flowing. And you have condensed much theory and practice of scientific intelligence test in a short compass. I am sure the book will be welcomed by the educational world and stimulate among teachers and parents an interest in this important but, in our country much neglected branch of study.”



# INTRODUCTION

We are passing through a period of transition. There is change in every walk of life. With this change, views and values are also changing. Whatever was considered good in the past is now, either being totally discarded or reorientated to suit the present requirements. In this age, when the Government is of the people, by the people and for the people; education of the right type is very essential. It is prerequisite for the correct understanding of the aims and significance of democracy. The larger the population of a country are educated in true perspective, the greater is the prosperity of that country. Education and the right type of education alone can be a panacea for all the economic, social and moral evils of a country. The emphasis on the right type is deliberate to differentiate between the education as spread by Hitler and Mussolini, and the one prevailing in Western Democracies. The former brought about national calamity of the greatest magnitude and the latter exuberance.

With India now emancipated, education has become more important with all its urgency than it

## II

was ever before. It is now no more a luxury of the privileged few but a necessity of all inhabiting this sub-Continent. The young mind, therefore, has to be prepared and brought to full stature to bear upon himself the grave but exhilarating responsibilities of the democratic set-up. It is with this desire that, this book has been contributed to the Nation's cause. There is diversity as regards communities in India, but there can be unity and cohesion in them through the medium of education for the glory and advancement of Mother-land.

Science has made the world a compact whole, and time and space are counted but little these days. As such, there should be intellectual expanse and depth in proportion to this compression. While remaining within the physical borders of our Country, we should go across them mentally to give and receive mutual sympathy and confidence and thus tighten the bonds of humanity.

It is fortunate indeed that, Mr Turner, whose reputation as an educationist is high, should have thought of bringing out the resume of his deep experiences that he had as an assistant master at Harrow, Principal of the Nizam College and Jagirdars' College and tutor to the prince Mukkarum Jah Bahadur. During the 20 years of his services in Hyderabad, Mr. Turner, very intently studied the mental capabilities of his pupils of all shades and grades of intelligence

### III

and calibre. This is a valuable addition to many a book he has so far written, and is expected to be of great help to teachers and parents in ascertaining the intelligence of the children. In the absence of such a guide as this, it has been painfully noticed that the young mind was either, indiscriminately taxed or totally neglected. Good many teachers who really endeavour to educate children as to make them useful members of society, often fail to achieve the desired results. This is simply because they are not fully cognisant of the methods by which every individual child's intelligence could be measured, and canalised in such directions as are compatible with his or her nature. If the tests suggested in this book are carefully applied, the efforts of the teachers will, it is hoped, be fructuous and what is called the educational waste will be stopped to a very large extent.

Notwithstanding the fact that, his is an unenviable lot, a teacher takes upon himself to supply intellectual material to the nation to make it suave and prosperous. He deals with lives and not with files, commodities and chattles. In this sacred undertaking he has certain indispensable sacrifices to make. It is to such honest teacher chiefly, that this book will be of much help and significance.

I shall always entertain the feeling of gratitude to Mr. Turner for the very kind instructions in teaching



#### IV

I was so lucky to receive under him as an assistant master at the Jagirdars' College. But for him, I would not have been able to contribute my mite by way of collaboration.

*15th August 1949*

K. AKBARULLAH KHAN

HIMAYATNAGAR

M. A.

HYDERABAD-DECCAN

## THE SCALE

The methods of education are ever progressive, and we realise more and more that the theories of comparatively recent years have been hap-hazard and lacking in definite purpose. The application of psychology to education has been confined to the vague teaching of "Method" in Training Colleges, but it has been bookish and non-practical in nature. Over a century ago, Herbart wrote of the practical ways in which exact observation and even measurement can be made of mental processes, and the distinguished educationist, Binet, embodied the same ideas in a practical scheme of diagnosis or measurement of mental power. Childish activities of speech and action were studied and estimated, and a series of simple tests gradually arose. Binet had one aim before him, to use the methods of psychology in diagnosing and

measuring the mental equipment of a child, and to establish a normal or average as a guide to the educationist. After many experiments in Paris, he brought forth a series of questions and problems now known as the Binet-Simon Intelligence Scale. The last word on this subject is the work by Professor Terman of America, who has drawn up a standardised and tested system to be used in the Education of school children. Binet-Simon system has been revised and broadened, in many cases to meet the specific needs of American children. It is, however, capable of application anywhere with slight modification. Indian children differ but little from those of France, England or America, and a knowledge of the Binet-Simon revision will enable school teachers in India to form a practical working estimate of the capabilities of their pupils, and to break away from the undesirable reliance on written examinations which impose such a severe strain and which are often an index of the amount of cramming and memorising done, rather than of real mental capacity.

Many teachers feel themselves competent to assess the merits of pupils by the light of nature. But it is sad reading to study the comments of teachers in terminal or annual reports sent home to parents. "Does not work hard," "Is careless and irregular" "Could do better," and such vague platitudes are applied to eighty per cent of a class. The retarded or deficient child is often kept in a class where the work is quite beyond his powers, and accused of being

lazy or indifferent. Boys and girls of very high capacity are often kept back in classes where the work is distinctly beneath them. Deficient pupils as well as those unusually brilliant can only be indentified and dealt with if we have an exact and scientific scale of measurement. The unaided and random opinion of the teacher has in many cases been found to be quite wrong, and has been the cause of real and permanent harm. But the considered opinion of a good and consciencious teacher will help out the Simon-Binet Scale; the two will be complementary and strengthening.

For a time it was thought that the application of tests for intelligence could only be made by teachers who had been trained in experimental psychology. In America and in Scotland, now, the method is used by the rank and file of teachers and is largely replacing the antiquated system of periodic written examinations. But it is highly necessary that the teacher using the Scale should have learned the exact methods to the very smallest particulars. We know that in written examinations there are strict examiners and lenient examiners; no such divergence can be allowed in the application of the intelligence tests, but there must be absolute uniformity of method and of scoring. In this, more than in any other branch of mental activity,<sup>2</sup> "A little learning is a dangerous thing."

No one who has had experience of the elementary and high schools of India can have failed to note the problem of the retarded child. About 25 per cent fail to pass through the classes at the normal rate, and will

be found at least one year behind. Some 10 per cent will be found to be two years behind and 5 per cent three or more years behind. This is educational waste, when one considers the time and labour spent in going over a course for the second time, and it is depressing and dulling for the pupils. So far we have only thought of special classes for backward children, or manual courses as an alternative. One school sought to find in defective health or undesirable social surroundings the explanation of non-success, and in so far as reforms were secured in those spheres this was all to the good. But no reform has yet been based on the assumption—the true one—that children vary greatly in their natural mental abilities. Thus instead of trying to whip a slow and defective child up to a standard which is too high, it is more sensible to recognise the inequalities which exist in child nature and arrange such different courses that each child may progress at the rate which is attainable. It is possible, at least, to avoid the undesirable failure and detention which is so common in Indian schools. A pupil enters with little relish upon a course for the second time with the humiliation of being overtaken by younger companions. If the work is arranged for each in accordance with natural ability, and not on the assumption that all are average and equally gifted, then detentions in a class for a year will be avoided.

The pupil who fails in class, or seems likely to fail, should be tested by the Binet Simon Scale. Some

forty five minutes suffice for this, and then the case will have been diagnosed as is done after a medical examination. It will soon be seen whether the fault lies in a deficiency of the child, or is merely due to lack of interest or unsuitable instruction. To form a special class is not enough if it is only being used to get rid of all troublesome cases from the ordinary class. Different types of failures exist: the feeble minded; those defective physically; those lazy and mischievous and pupils suffering from poor home or social surroundings. Such different problems require different treatment, and scientific classification is an indispensable preliminary.

Up-to-date, intelligence tests have only been applied to cases in which there is definite presumption of feeble-mindedness, in order to determine the nature and the extent of the failing. In past years, cases of slight mental deficiency tended to be over-looked, and only cases which were obvious enough to be recognised in ordinary medical examination were taken stock of. In America it has been found that at least two pupils in every hundred entering school have mental powers which will never develop beyond the level of the normal child of ten or eleven years. The most of them can be termed Morons, that is the type which will never progress beyond the intelligence proper to the child of from eight to twelve years. Yet we have known such obviously defective types pass a low School Leaving Certificate, after several

failures, and spend one or two ineffectual years in college, before being persuaded that they were incapable of higher study. That teachers allowed this to happen shows that the facts had not been realised or the cases properly understood. In Europe and America, it is being increasingly realised that the State must protect such defectives. It should be kept in mind that defectives almost invariably produce defectives in the next generation, and that the reproduction of mental defectives mean the reproduction of poverty and crime, for much of poverty and crime is entirely explainable in terms of mental deficiency. Thus the State is the proper guardian of the pupil who is of such intelligence as is markedly deficient.

As we have remarked, crime or moral lapses are very frequently to be attributed to mental deficiency. Lombrose and his school tended to examine the physical characteristics found in criminals, and to trace crime to certain physical defects such as cleft palate, defective teeth, abnormal shape of the skull or brain, etc. But recent research shows that at least 30 per cent of crime is due to mental deficiency, and the physical features noted by the Lombrose methods are merely things which often accompany mental weakness. In this respect, I have had no opportunity of research in Institutions for the feeble minded in India, but shall quote some findings by Pssoerrfo Terman:

Of 100 girls tested in Ohio State Reformatory, 36 were found to be definitely feeble minded. They had not previously been regarded as such.

Dr Goddard applied the Binet Tests to 100 young persons selected at random from those appearing before the judges of the juvenile court in Newark, New Jersey. Nearly half were clearly deficient in mental powers.

Dr Fernald's tests of 100 prisoners in Massachusetts State Reformatory showed that 25 per cent were below average intelligence.

Of 200 pupils tested while in Borstal Institutions in Great Britain, seventy four proved to be definitely weak in intelligence.

These are but a few from many selections which bear out the conclusions arrived at by practical medical officers and students of eugenics, that feeble-mindedness is almost invariably transmitted to the next generation, and that it is the basic cause of much vice, crime, inefficiency and immorality. Morality depends on strength of character, and the normal child should develop in two directions: he should have intelligence enough to see in advance what will be the results of different kinds of conduct as regards himself and others; he should have the desire and the power to restrain his wishes, or, as we would say, to resist temptation. Many criminals have the first factor,



but not the second. They may be strong and intelligent characters, cynically indifferent to immoral issues. Thus not all criminals are feeble-minded, but all feeble-minded are certainly potential criminals. In daily life it is commonly recognised that a feeble-minded woman is liable to become immoral from sheer inability to protect herself; researches in the London police courts have shown that a large percentage of prostitutes are below average in intelligence.

Moral responsibility and self-control do not exist naturally in the young. Children have to be trained in the code of ethics deemed desirable. Hitler showed that in one generation the young can be trained to look on immorality, vice and violence as ideal qualities. Criminal tribes have been known in India which deliberately trained the young to become skilful thieves; as Milton's Satan said :

.        "Evil, be thou my good!"

The proper attitude towards the rights and the property of others is only laboriously instilled into many children by firmness, and, oft-times, by punishments. The child comes to learn that only a certain kind of conduct will stand him good, and that departures from it are accompanied by pain and disturbances. Thus the juvenile of the race must learn how each particular act is likely to fit into the general scheme of society and what its consequences are likely to be. If the consequences are likely to be bad for

self or others, no matter how much the immediate gratification and pleasure, then self restraint must be exercised and the desire put into control. Children have not such self-control by nature, nor do we expect them to have. When it happens that the child becomes a man but retains the normal mind and intelligence of, say, ten years, then that man (or woman) is but a child as regards the powers of control so necessary in a stable human society. The ideal, yet so far distant in India that the very beginnings cannot yet be seen, would be psychological testing of all juveniles, so that the great mass of crime and vice, which is so very wasteful in the national life, can be prevented by anticipation.

Just as we have mentally deficient children, so we meet a fair proportion of superior or higher intelligence than the normal. These supply the leaders and rulers of the future for any race, the creative thinkers, scholars and scientists. Through the unfortunate tendency to arrange classes and courses as if all children were equal in ability, these higher-intelligence types are retarded by having to work in the same classes with pupils of average or deficient mental powers. A fortunate pupil has his abilities recognised and rises up by promotion into higher classes, but many are not recognised, or are kept back by the unfortunate belief that promotions may be harmful and that a pupil is likely to suffer in health by being raised upto the status of older companions. Thus for every

bright child rightfully promoted in accordance with his merits, two or three are overlooked or deliberately kept back. Some old-fashioned teachers frankly state that they object to all promotions on principle, and they do not realise that harm may be done by keeping a higher-intelligence pupil back among his inferiors.

Teachers are not often well trained in elementary psychology, and often fail to recognise mental powers above average in a pupil. If they do recognise the powers, they do not like to part with that pupil, or they use the "damage to physical health" argument for retaining him. We can recall the following two cases:

(1) *Appa*. Was in Class V at the age of 14. Quiet and reticent, made little effort for distinction, but was content to get off with as little work as possible. Teachers' reports made him "average" and "lazy" — the second of which was certainly true.

But intelligence testing showed an Intelligence Quotient of 115, that is of higher intelligence. He was promoted directly from Class V into VII, and after another year, into IX. Kept under close supervision and made to work hard, he took a place above the average in Class IX.

(2) *Ali*. In Class VI, used to take 2nd and 3rd place in most subjects. In intelligence testing, came out above all others in class by a clear margin, and

was indisputably of higher intelligence. Teachers argued that he was too young for promotion, and was not robust enough in health. But was promoted to Class VIII where he took a high place, and improved in brightness and interest in consequence. Went on to College and took a good Degree.

. There is a superstition—it can not be called anything else—that children with very high intelligence, are liable to be unusual, freakish, neurotic, and of delicate health. To test this, Professor Terman had a group of thirty-one children, all remarkable for high intelligence, examined in respect of such qualities as general health, studiousness, moral character friendly qualities, love and play. In all cases, they compared favourably with other children, being higher instead of lower than the average. This unfounded fear is, therefore, not to be taken into serious account. It is highly desirable that teachers should be on the look-out for pupils of superior attainments with the object of seeing that they are unable to study in the sphere to which their abilities entitle them. Unless given work which will call out the best in them, there is a danger that they will be contented with just sufficient to keep up with others and will fall into habits of laziness. No one is under greater temptation to be lazy than the bright boy or girl who takes too easily a high place among average pupils.

In the future, intelligence tests will probably be used to give an index of a child's fitness for a certain vocation. That does not mean that tests will show that a pupil is suited to be a teacher but not to be a physician, for no such ambitious discrimination is claimed for the Scale. But it will be possible to say with some degree of accuracy what are the pupil's mental abilities, and to give an approximate estimation of the chances of success in technical or skilled professions, with their higher demands for brain power as compared with unskilled or manual labour. The minimum degree of intelligence required for success as a doctor or a lawyer should be capable of calculation. In industrial works of England and America, there is loss and wastage because of the employment of persons who turn out to be insufficiently intelligent for the tasks they are called upon to undertake. Now certain advanced firms employ a full-time psychologist to test all applying for employment and to weed out the unfit. For a pupil to come from school with a well-attested and satisfactory certificate of a good intelligence quotient will be a passport to employment. Researches among the unemployed in England, especially among those describable as unemployable or chronically unemployed, show that there is a far larger percentage of feeble intelligence than among normal workers in full-time employment. In other words, deficient intelligence is a factor leading to unemployment.

We know that heredity does play a distinct part in intelligence. Intelligent parents are likely to have intelligent children. We know also that insufficient or unsuitable food, bad teeth, defective housing, poor ventilation, malaria and other diseases all play a part in reducing intelligence. We do not know the precise extent to which any of the above factors influence intelligence. In the case of a lowly paid and unintelligent manual labourer, it is very difficult to say to what extent his poor mental equipment is the result of unsatisfactory environment and defective living conditions, or the result of heredity. Intelligent pupils are certainly more common in the families of educated parents which a high standard of living than among the poor. Is that because the educated middle classes are really superior stock, or is the disparity to be explained in the fact that the children triumph over those of the poor because of better home conditions and educational facilities? Scientific intelligence tests can approach this question with a fair chance of giving a satisfactory answer. We can then decide whether natural ability or good opportunities contribute most in making a success. The various Socialistic parties have no doubt as to the answer, and believe that the children of the poor are at least as well endowed mentally as those of the privileged rich. The leading figures of the great Soviet Union are men who have risen by sheer merit from poverty and repression. In any case, exact knowledge about all kinds of intellects will be of an immense benefit in

ordering society and guiding the lives of people. There is in India an immense amount of waste and inefficiency owing to the fact that men and women are allowed to press on at random into occupations which they are unfit to follow. The builder tests his materials before he erects the house; the same must hold good in the nation.

## II

Many teachers will not admit the need for tests, and believe they can discriminate between different types of intelligence by purely common-sense methods. Certainly the difference between a clever pupil and a dull one is sometimes so obvious as to be apparent to any one. But there are many cases which are obscure and do not fit themselves naturally into such obvious classes as "clever" or "dull." As in the case of an obscure illness, it is necessary to have a searching examination and exact diagnosis. Before we can judge of a pupil's intelligence, we must agree as to what standard we will accept as average intelligence. The teacher often speaks of the average as if this meant the average of the particular class with which he or she is dealing. But this may be higher than the average of last year's class and not so high as the average of next year's will be. Teachers also neglect to take into account the age of a pupil in assessing intelligence. I remember calling for a report on a certain boy, and was told that his ability was average. On further inquiry the teacher explained that the lad

took an average or mid-way place in the work of the class, in this case Class VI. But the pupil was 15 years of age, while the average of the class was 13. The pupil was two years retarded, and for a boy of 15 to have the intelligence of an average boy of thirteen means that he is to that extent defective and below his own proper average. The retarded pupil is a painfully common sight in the schools of India, and sometime the question is very much complicated by the fact that parents in many parts of India send their children to school rather late in life. They receive no proper education before the age of, say, eight years, or are given "coaching," by some unqualified person. Thus a lad, coming to school for the first time at the age of eight is, found to have precisely the same mental equipment as the average boy of five years. Now this neglected pupil may have sufficient natural intelligence to make up for this delay in starting in school work, and if tests show that he is of average native ability, should be brought on quickly to the stage where he should be. But that will not be done by putting him in the class with five-year-old pupils and letting him keep pace with them. Special attention is absolutely necessary in such cases, and that is why a school should make a condition of admission, that a pupil should be by age and training fit to enter into the class where he properly belongs. Here is a case.

SHAH. A boy in secondary school class, (VIII) of neat appearance with singularly unexpressive face



Was getting average marks in some subjects, failing badly in others. Teachers gave the following opinions "Quite average," "Fairly clever," and "Not bad." With such crude and vague pronouncements, we arrive nowhere. But the fact was over-looked that the boy, who came from a good home, was 18 years of age, in a class made up of boys of 14—15. He should have been assessed as deficient to that extent. Enquiry showed that, because of his age, he had just been promoted, against the marks of his examinations, in the hope that he would "make up." He managed by similar means to get into Class X and tried unsuccessfully in the School Leaving Certificate Examination for three successive years, failing completely every time. The fact should have been recognised that the boy was of weak intelligence, that he was not likely to profit by the usual school course, and that only special class or a different kind of training would be of any use to him. There are many such cases in our schools. ~

In the same way, teachers often fail to recognise higher intelligence in a child who is younger than the other pupils of the class. If a boy is average in class work, but in age is one or two years less than the other pupils, that is a strong presumption that he is above average in intelligence. Only a consideration of age plus class work gives a proper conclusion, and the only true reliable method is to submit the pupil to intelligence tests.

It is true, of course, that it is sometimes fairly difficult to distinguish between weak intelligence and lack of all preliminary instruction that a pupil should have received. In the cases already quoted of boys coming to school for the first time at the age of eight or nine years, there will of course be a great want of the knowledge of reading, writing and elementary arithmetic that one expects to find in a child of that age. There may be some retardation of intelligence owing to the bad methods used, or the lack of any methods at all, but this is not the same thing as actual deficiency. Application of tests which do not call for a knowledge of the preliminary work of the elementary school will soon establish whether the pupil has sufficient or average natural intelligence, apart from lack of preliminary training. I have known boys of ten unable to read a few words of English (they were applying for admission to an English-teaching school) and hence characterised by the teachers who conducted a preliminary test in general subjects as absolutely dull and ignorant, knowing nothing. But a brief test in their own Urdu language would quickly elicit the fact that they possessed plenty of natural intelligence. Only by experience and practice in the use of tests will the teacher be able to discern whether poor responses are due to deficient intelligence or lack of instruction. Here is another case:

*Ram* After eighteen months at school, at the age of 8, had learned very little. Two teachers reported

that he was mentally deficient and unable to learn anything at all. He could read a little in a monotone, but evidently without understanding. The Binet-Simon test revealed that his powers of intelligence were normal, but that he had a surprisingly low vocabulary in Urdu ( his mother tongue ) and even less in English. On enquiry it was found that he had been in the habit of spending all his time with his mother, who was dumb and partially deaf, and had been discouraged from talking. Three years later this boy was doing quite well, and passed through the High School course with success.

If one were to ask a number of teachers the question, "What methods do you employ in testing the intelligence of pupils?" the answer would invariably be, "By asking questions". As a rule, most teachers fail to discriminate between testing knowledge of school subjects and testing intelligence, and there is almost a universal tendency to estimate intelligence by success in school subjects. Some teachers place great reliance on arithmetical tests, others believe that ability to read aloud with clearness is an example of a searching test. A few come rather nearer the crux of the matter with such general questions as: Why do you wear a cap? If you had ten rupees, what would you do with it? What kind of work does a soldier do? Which is more heavy, a pound of iron or a pound of wood? Which would you rather have, half a rupee or eight annas?

Some are greatly influenced by the appearance of a boy or girl, particularly the expression of the eyes. But it will be found that many deaf mutes and deficient children have pleasing features. On the whole, teachers in the past have not had a clear idea of what constitutes intelligence, but have confused it with ability to memorise, to read and count, etc. They are led away by pretty features, even though they conceal a defective mind; they do not realise the infinite possibilities of wrong judgment.

In assessing a number of pupils in any kind of oral examination, teachers tend to assign a particular mark to the first pupil questioned, and then take that as an average and mark the others by comparison with the first. None have any method of reference to a form or standard average; indeed only the Binet scale is likely to give that. Now the Binet scale is only an elaboration and standardisation of the common-sense method of asking general questions. Most teachers who have expected to find something entirely new and learned tend to exclaim in disappointment, "Is that all? Why all this mystery about a list of simple questions?" But there is all the difference in the world between a scientifically designed list of questions, applied with uniform and unvarying method, and marked with scientific precision, and questions asked at random in which different ideas prevail of what they should be and how they should be marked and to what extent they are to be repeated

and the pupil helped out. Left to their own natural sense, different teachers will form absolutely varying estimates of the intelligence of the same pupil; the Binet scale is precise and unvarying, and does not yield variations owing to different types of examiners. No person, however able and experienced in the ordinary walks of school life, can arrive at an exact estimation of intelligence without scientific tests. The Binet system is the one proved and standardised system which has made good in France, America and Britain. In the hands of a trained teacher, it has proved to be well-nigh infallible.

## II

### THE BINET-SIMON<sup>1</sup> SCALE

The scale consists, as already stated, in a number of questions or exercises the answer or solution of which requires intelligence. Binet himself drew up 54 graded tests, suitable for ages from 3 to 16, or the average adult. They are so planned as to be a test of natural mental power and not of knowledge gained in the class room. There are different kinds or branches of intelligence, so different kinds of questions deal with them. Some questions are a test of memory, some of power to reason, of ability to comprehend and hold a new idea, to show a grasp of units of time or of number, to combine two facts and draw a conclusion from them, to show knowledge of the child's environment. The tests were originally proved by

trying them out on large numbers of children of different ages. It was found, say, that a certain test was passed by only a few children of five years, by a few more at the age of six, and by some 65 - 75 per cent at the age of seven. When this had been found to hold good in several different lands, it was adjudged to be a suitable test for the intelligence of normal seven-year-olds. In the same way, a test passed by about 70 per cent of ten-year-old children, but yielding as many as 90 per cent of passes at eleven years, will be esteemed a good test of ten-year intelligence. After experiment on many tests, Binet drew up a scale of tests with five for each year of school age. For Example his tests for the age of 10 years are:—

- (1) Arrange five blocks of different weights in order of weight.
- (2) To copy drawings from memory. The drawings are simple designs or patterns which are shown to the child for a little. Then they are removed and he is asked to draw them from memory.
- (3) To criticise statements containing manifest absurdities. This load is too heavy for the donkey to pull, so we shall had two more bags to it.
- (4) To answer questions of "comprehension" Eg. What should you do if some one asks you to do something you know to be against rules?

- (5) To use three given words in sentences.  
Eg. Use the words: boy; class; late in sentence.

To quote the simple tests gives a poor idea of their application or Binet's methods of using them. It is necessary to understand fully the aim of each test, the correct method of applying it, and the value to be allotted to various different types of answers which may be expected. Binet's scale was not final, and his tests have been revised and altered since his time in the light of later experiment. By means of the scale, it is possible to compare the performances of a pupil with performances of average pupils of the same age, and so to decide whether he is above or below that standard. To do this, the pupil is started at a point where he passes all the tests successfully (just as in the high jump competition all start by jumping over an easy height, and then raise the cross bar by inches at a time.) He goes up the scale in order of difficulty until he reaches a stage where he can answer no more. Then we compare his standard with that of normal pupils, and see whether he has gone lower or higher than they have. Suppose we are testing a boy of eight years old. If he progresses as far through the tests as average boys of eight years do, we say that his mental age is eight years; since this corresponds with his actual age, the boy is normal. If he goes only as far as children of six years normally do, then his mental age is six years and he is two years

retarded or in defect. Similarly a brilliant child of eight years old may show mental powers of the ten-year-old child, and is thus classified as of higher or "superior" intelligence.

The system depends on this use of age standards, on the fact that Binet and those who succeeded him have carefully worked out a set of tests found to be universally of the proper standard for each particular age. Thus we can work out the intelligence of a pupil by experimenting until we find which set of tests he can come up to. If we find that he can do the ten-year tests, his mental age is ten years. We turn then to his real age. If we find that he is eleven years old, we see that he is one year backward. If he is eight years old, his mental age is two years better than the average. In the beginning, we had from investigators a set of indefinite classifications such as: bright; dull; very dull; feeble-minded. In place of these, we say that a pupil has a mentality of ten years, and this is universally understood by all using the tests. If we are told that pupil of ten years has seven-years mentality, we know at once the level of work that he can face.

Psychologists before Binet had concentrated on testing memory, power to concentrate, accuracy of the various senses. He alone aimed at testing general intelligence which is apart from the individual parts. His conception of the abstract power called intelligence was that it has three sides:—



- (1) Power to take and keep a certain direction.
- (2) Power to adapt itself in search of a desired-end.
- (3) Power of self-criticism.

All these three factors enter into the various tests of the scale. Take for instance the test where the pupil is asked to fit together certain pieces of cardboard so as to form a complete rectangle, a variation of the usual scrap-puzzle. Now the three points are: the pupil must keep in mind the figure to be formed, namely, a rectangle; he must try various combinations and make various changes as they are found not to suit; he must criticise any combination when completed and see how it agrees with what he set out to do. This is the same triple requirement found in many of the Binet tests. But there is no single conception of intelligence; the approach to it must be from different quarters. Intelligence has been defined by Spearman as the "common central factor" active in all special mental activities. Binet's tests apply to each and every aspect of this. They call up the various mental processes which seem to be employed in intelligence, and vary according to the different ages of the pupils. If a test seemed to be passed by just as big a percentage of young children as by those of greater age, it was dropped. If a test was such that the percentage of passes increased with each year of age, and if children known on other grounds to be highly intelligent passed it more frequently than those known to

be dull, then the test was retained as having justified itself as a reliable index of intelligence.

In forming his Scale, Binet sought to find an arrangement in which average child of any age would come through the test showing a corresponding mental age, eg. that a seven year old child would pass showing a mental age of seven years. Thus in deciding for which age a certain test was suitable, it would be decided to place it among the tests of that year in which from 65 to 75 per cent of children passed it (that is of a sufficient large number of children tested, with all kinds included and no selection). In the final drawing up and trying out his tests, certain errors were ultimately found. Some tests were found to be too easy for the particular year, and had to be moved down to the tests for those one or even two years younger. Some were found too difficult, and had to be raised up to the group for older pupils. Different educationists arrived at different conclusions as to the age group for which a particular test was suitable. Finally the Stanford revision corrected such points as far as common agreement could be attained.

Keep in mind that Binet's scale does not pretend to measure the entire mental field, but only general intelligence. The emotions vary in different individuals and so does the will power; the difference between two pupils of equal intelligence, one with strong will-power and one with weak will, will be great. The scale will not help to analyse abnormal

conditions of the emotions such as neurosis, hysteria, and the like. But the scale may help to trace out such conditions by showing defect in intelligence which accompany them, for normal intelligence is seldom found hand-in-hand with deranged and upset emotions or inhibited will. Thus the Binet scale may indirectly yield information regarding the subject's emotional life and will.

While using the Scale to estimate a pupil's grade of intelligence and his power of receiving instruction this does not mean that we must close our eyes completely to facts presented from other sources. It would be a mistake to do so and claim that the intelligence tests are all-in-all. Although they are the most reliable and scientific method of recording intelligence, we must not ignore the evidence of the pupil's family and personal history, his medical record, habits at play, moral conduct, and the home and social environment. These will be found to supplement and bear out the results achieved by the Binet tests, which will be helped to yield the best guides to future improvement and educational advance if supported by as many allies as possible.

#### IV

##### THE STANFORD REVISION

The Binet scale showed, in working, several points which called for revision and correction after a period of practice. This revision was the result of years of experiment on thousands of subjects, both normal and defective. The main contributors were Americans, who summarised the results of their own

efforts as well as results collected from different countries. Certain tests which had not done so well as expected were eliminated or shifted to different years in the scale; new tests were thought out; particular attention was given to methods of questioning and scoring. In all 90 tests were drawn up, 6 for each year of age from 3 to 10, 8 for the children of 12, 6 for those of 14, 6 for average adults, 6 for "superior adults" and 16 tests were kept as reserve or alternative tests if required. The following is a list of the tests in the Stanford Revision of the Binet-Simon Scale. Those marked Al. are alternative or reserve tests. Instructions for applying and marking the tests will come later on.

### AGE '3

*(6 tests, each valued as equal to 2 months.)*

- (1) To point to parts of the body. Three out of four must be shown correctly. (Show me your eye; your ear; your mouth; your nose.)
- (2) To name familiar objects. Three out of five must be named correctly. (What is this? showing pencil, coin, watch, key, egg.)
- (3) Enumeration of objects in pictures. Keep two or three standard pictures, showing, say, an indoor scene, a street scene, a field scene. Ask the child to name some

things he sees in the picture. It will be a pass to name correctly at least three objects in one picture.

- (4) To give six correctly. (Are you a little boy or a little girl ?
- (5) To repeat sentences of six or seven syllables. Say this after me: My brother has a little dog; My pen is in my pocket; I have lost my new pencil (The test is passed if one sentence is repeated without error after one reading.)
- (6) To repeat correctly three numbers spoken by the examiner. Say: 3-6-2: 8; 5; 3: 7; 4; 3. If one set is pronounced correctly, that is a pass.

#### AGE 4

*(Six tests, each valued as equal to two months.)*

- (1) To compare lines of unequal length. "On this paper, there are two lines." Show me which is the short one. Show me the long one." Then change the position of the paper and ask the same again. The trial is passed if no error is made in three trials.
- (2) To discriminate between different forms. Place before the child a card containing circles, rectangles, triangles. The exami-

ner has a duplicate set. He indicates a circle on his duplicate paper, and asks, "Can you find me one like this? Now, (indicating the triangle) can you find me another like this?" The test is passed if seven out of ten attempts are correct.

- (3) Counting annas, up to four. Place four annas before the pupil. "Now I want you to count these annas. Begin-one!" The child must count correctly up to four, touching each with the finger.
- (4) Copying a square, using pencil. To pass, one out of three efforts must be a fair attempt at a square.
- (5) Test of comprehension. "What should you do when you are feeling cold? when you are thirsty?; when you are tired?; when you are sleepy?" Two out of three must be answered with some sense.
- (6) Repeating four numbers. One must be correct out of three efforts.
- (Al.) Repeating sentences of 12 or 13 syllables. One out of three efforts should be quite correct.

#### AGE 5.

*(Six tests, each valued as two months.)*

- (1) Comparison of weights. Two weights are

necessary, cubes of equal size and appearance, weighing 3 and 15 gms. respectively. The pupil must pick out heavy and light three times without error.

- (2) Naming colours. On a prepared card, the pupil must name four colours: red; blue; green; yellow, without error.
  - (3) Aesthetic comparison. A picture or drawing with three pairs of faces; in each pair one is handsome and one is markedly ugly or ridiculous. The handsome must be indicated without error.
  - (4) Definitions of familiar objects. The answer must at least state simply what is the *use* of the object. (chair; cow; spoon; book; pencil; table.) Four out of six must be correct.
  - (5) Assembling two parts of a divided rectangle. The child is shown a complete rectangle as guide, and invited to assemble the two parts to make up the figure. To pass, two trials to be correct out of three; one minute allowed for each trial.
  - (6) Three commissions. Eg. "put this key on the desk, open the door, and bring me that book." No error is allowed.
- (A1.) Tell me your age.

## Age 6.

(*Six tests each valued as equal to two months.*)

- (1) Right and left. "Show me your right eye; your left hand; your right ear." No error.
- (2) Deficient pictures. Show a drawing of a head in which some obvious feature, eye, mouth, etc. has been omitted. In four efforts, the missing feature must be correctly named.
- (3) Counting thirteen annas. Give two trials; one must be quite correct.
- (4) Test of Comprehension. What would you do if:
  - (a) It began to rain as you were walking to school?
  - (b) You found that your house was burning?
  - (c) If you were going somewhere, but missed your train ( or bus, )

(*Two out of Three must be answered with some correct sense.*)

- (5) Naming coins. Show one anna, two anna, four anna, eight anna piece. (Three out of four must be named correctly.)
- (6) Repeating sentences of 16-18 syllables. (One out of three efforts must be absolutely



correct; or two efforts with one error each may be accepted as equivalent.)

(Al.) Saying whether it is morning or afternoon.

### AGE 7.

*(Six Tests, each valued as two months.)*

- (1) Giving number of fingers. The pupil must give the number of fingers on right hand, left hand, both hands. No errors for pass.
- (2) Describing pictures. The same pictures as in Age 3 Test 3, but here definitely half of the response must be description of the picture and not merely enumeration of objects.
- (3) To repeat five numbers. (One out of three trials must be completely correct.)
- (4) To tie a bow-knot. One is shown as model and one minute is allowed.
- (5) To give differences between objects. three pairs of objects are used: fly and butterfly; stone and egg, wood and glass. In two out of the three a definite difference must be given.
- (6) To copy a diamond-shaped figure. Pencil is used. Two efforts out of three must be passable.

- (Al.1) To name the days of the week. Three questions are then asked to check understanding. To pass, the pupil must name the days in correct order and answer two of the three check questions correctly.
- (Al.2) To repeat backwards three numbers given by the examiner. Three series are given, and two out of three must be correct for a pass.

## AGE 8.

*(Six tests each valued as equal to two months)*

- (1) Ball and field test. (See *Chap.* on detailed description of tests.)
- (2) Count back from 20 to 1 (Time 40 seconds. One error allowed.)
- (3) Test of Comprehension higher degree.  
What should you do ?
  - (a) When you have broken something belonging to another person ?
  - (b) When you are on your way to school and see that you are going to be late ?
  - (c) If a companion hits you by accident ?

*(Two out of three to be answered with some sense.)*

- (4) Give similarities in different pairs of things.  
Eg. What is alike in : (a) an apple and a

mango, (b) wood and coal, (c) iron and silver, (d) a ship and a motor car.

*(Two out of four to be answered correctly)*

(5) Giving definitions fuller than merely stating what the thing is used for. What is: (a) a balloon, (b) a tiger, (c) a football (d) a soldier? (Two out of four to be correct.)

(6) Vocabulary. Defining 20 words.

Al. To name six coins: pie, one anna, two anna piece, four anna piece, eight anna piece, one rupee. (No error allowed.)

#### AGE 9.

*(Six tests, each valued at two months.)*

(1) What is the date? Required, name of day, month, day of month, year. Allow 3 days of error in day of month, but on error in the other three.

(2) Arranging five weights in order of weight. As before, cubes of equal size and appearance, weighing 3, 6, 9, 12, 15 grams. Must be done correctly twice out of three efforts.

(3) Giving change for money. Using a rupee and some small change, ask the child to give change for a four-anna purchase, seven annas, ten annas, (No pencil or

paper allowed. Two out of three to be correct.)

- (4) Repeating four numbers backwards. Eg. I am going to say four numbers, and I want you to repeat them backwards: 3-8-4-7. (One effort out of three must be correct.)

- (5) To make up sentences using three words. Eg. "Make a sentence using (a) boy; garden; ball (b) cow; milk; butter (c) bicycle; road; stone. Instead of a sentence, two co-ordinate clauses may be accepted.

*(Two out of three groups to be done correctly.)*

- (6) Name the month of the year (Either Christian or Fasli Calendar.)
- (Al.) Giving the total value of a number of different stamps. (Second attempt given if total is wrong but individual values are known.

#### AGE 10.

*(Six tests, each valued at two months.)*

- (1) Vocabulary. To define thirty words from a selected list.
- (2) To recognise absurdities of statement and correct them. Eg. "The road is uphill from here to Secunderabad, and uphill

coming back again." What is wrong with that? (Four out of five to be properly corrected.)

- (3) To reproduce by drawing designs from memory, after being shown them for ten seconds (In two efforts, one should be correct and one fairly similar to the original.)
- (4) To read a short passage containing eight points of memory; then to report it from memory. Two errors allowed in reading, and six points at least must be reported.)
- (5) Comprehension. More difficult than at Age 8. Eg. What should you do when:
  - (a) some one asks your opinion about a person you do not know well?
  - (b) you are about to start an important piece of work?
  - (c) why should we judge a person more by his acts than by his words?
- (6) To repeat or name any sixty words.
- (Al.) To repeat six numbers after hearing them once. (One effort out of two should be quite correct)
- (Al.) To repeat sentences of from 20-22 syllables

(One out of three to be correct, or two with one error each.)

### AGE 12.

(*Eight tests, valued at three months each.*)

- (1) Vocabulary. 40 words. (A rough definition of 40 words from a prepared list, enough to show that the meaning is known.)
- (2) Definition of abstract words. Eg. hope; greed; envy; charity; justice. (Three out of five to be given an understandable definition.)
- (3) Ball and Field test. See chap. Should show evidence of a definite search-plan.
- (4) Arranging jumbled sentences. Eg. "For the started an we country early at hour." Two out of three to be correctly rearranged; one minute to each sentence.
- (5) Deriving moral or lesson of fables. Eg. Hercules and the Waggoner; The Fox and the Crow etc.
- (6) Repeating five numbers backwards. (One effort out of three to be quite correct.)
- (7) Interpretation of pictures. Explanation of the action or scene is required

enumeration of objects is at this stage not enough.

- (8) Giving similarities or common points in three things. Eg. In what way are the following similar?

snake; bull; sparrow

book; teacher; news-paper

wool; cotton; leather

nail; anna; piece of wire

rose; mango; tree

#### AGE 14.

*(Six tests, valued at four months each.)*

- (1) Vocabulary. Fifty words from selected list, and the response should show roughly that the meaning is known.
- (2) Induction test. (Holes made in folded papers; see chap) The test is passed if the rule is grasped by the sixth folding.
- (3) Repeating seven numbers. (Two out of three efforts to be quite correct.)
- (4) Problems of fact. Eg. A man walking through the jungle suddenly stopped, very much frightened. He had almost placed his foot upon a - what?

My neighbour has been having some visitors this morning. First there came quickly to his house a doctor, then a lawyer and a priest. What do you think was happening there?

A villager coming to town for the first time saw a man riding along the street. He said, "That man is lazy. He walks sitting down." What was the man riding upon, that caused the villager to say this?"

*(Two out of three to be correctly answered.)*

- (5) Arithmetical reasoning. Eg. (a) If a man earns eighty rupees a month and spends sixty five rupees a month, how long will he take to save seventy five rupees? (b) If two pencils cost eight annas how many pencils can you buy for four rupees? (c) If cloth costs 15 annas a yard what will be the price of seven feet of cloth?

*(One minute is given for each problem; two out of three to be answered correctly.)*

- (6) The clock. Supposing that it is six-twenty-two o'clock, or twenty two minutes past six, can you see in your mind where the large hand of the clock would be and where the small hand would be? Now suppose that the two hands of the clock change places; the minute hand takes the place of the hour hand. What time would



it be now? Do the same with the times 1·10 and 2·46 o'clock, i.e. ten minutes past eight and fourteen minutes to three o'clock. (Two out of three must be answered with no more error than 3-4 minutes.)

### AVERAGE ADULT

*(Test for 16 years or over. Six tests, five months easy.)*

- (1) Vocabulary. Sixty five words from special list.
- (2) Explaining moral lesson or theme of fables. (As in Age XII, but a broader and fuller explanation required as explained in later Chapter.)
- (3) Difference between abstract names of qualities, &c. Eg. What is the difference between laziness and idleness; evolution and revolution; poverty and misery; character and reputation; fame and rumour boldness and insolence?

*(Three good answers out of four required.)*

- (4) Problem of the enclosed boxes. (You see this box. Inside it are two smaller boxes. In each of the smaller boxes there is a still smaller box. How many boxes are there altogether, Counting this one?) Next: Here is another box. This box has

two small boxes inside, and each of the small boxes contains two tiny boxes. How many boxes are there in all? The third problem states that there are three small boxes inside, and each of them contains three tiny boxes. In the fourth problem, there are four small boxes inside, each containing four tiny boxes.

- (5) To repeat six numbers backwards. Eg. Listen to the following: I am going to give you some numbers, and I want you to say them backwards: 4-7-1-9-5-2. (One effort out of three must be absolutely correct.)

- (6) Use of a code. See later Chapter on detail for this test.

Al. 1) To repeat sentence of 28 syllables. (One effort out of three must be absolutely correct.)

Al. 2) Understanding of physical relations. (a) Path of a cannon ball. Draw a line on paper 6-8 inches long; at one end, above this line draw a short line  $\frac{3}{4}$  inches long, parallel to the original line. The long line represents level ground, and the short line a cannon which is parallel to the ground. The cannon has been fired and the ball struck the ground here (make a mark) Take the pencil and draw a line showing the path of the cannon ball from the cannon to where it struck the ground. (b)

- (b) We know that water holds up a fish that is in it. Suppose we have a pail partly full of water. We weigh it in the scales, and find the weight of pail plus water to be fifteen pounds. Now we put a fish weighing two pounds into the water. What will be the total weight now?
- (c) A man has a gun which shoots well up to 100 yards and over. He is shooting at this pail. Is it harder for him to hit the pail at 100 yards than it is at 50 yards? Explain.

This list of tests differs in some respects from the Binet scale of 1908 and also from that of 1911. There has been extensive experiment and tests have been eliminated or raised or lowered in the scale. The method of applying and the scoring have been tried out in full so as to secure absolute uniformity in handling. This scale has proved itself. Children tested by it tend to show the same result two or three years after, when tested by the same or another teacher. Earlier scales tended to yield varying results under similar circumstances; mental ages obtained by the same children in later years. In the original Binet scale, superior intelligence or slight grades of mental deficiency were often overlooked and classed as "low average." This is important, because it is highly desirable to have a scale of intelligence tests that is uniform and to be depended upon at all stages.

It is, of course, not claimed that absolute perfection has been attained, or that it will ever be.

## V

### *The Prevalence of Intelligence Grades.*

It is of value to know the distribution of the various classes of intelligence in a nation, to estimate how high is the average level and how great are the percentages above and below that average. It is only by applying the tests to very large numbers in different areas of a country that the answer to this question can be secured, and it is not likely that this can be done in India for years to come. Even then the question would be complicated by the existence of large sections of uneducated and poverty-stricken people. The figures which follow are taken from Professor Terman's findings in the case of American children; while research has not been so thorough in England, results are approximately similar. Keep in mind roughly that if a child of, say, 10 years shows by test a mental age of 8 years, his mental or Intelligence Quotient is  $8/10$  or 80; if he shows a mental age of 12 years, his I.Q. is  $12/10$  or 120. Normal intelligence would be  $10/10$  or 100 %.

The average intelligence group will contain slight divergencies; in practice there will be little difference between the child testing at 98 and the one classed as 102. The examiner, because he represents the human factor, is entitled to this small margin. So we shall

take average intelligence as applying to all children whose intelligence quotients come in the group 96-105.

In a test made of 1000 unselected American children, Terman made the distribution of intelligence to be as follows:—

I. Q.	Per centing
136-45	·55
126-35	2·3
116-25	9 0
106-15	32·1
96-105	33·9
86-95	20·1
76-85	8·6
66-75	8·6
56-65	·33

The above were calculated on the results obtained from the 905 children of 5-14 years of age; it was found that those of 15 years and over tested on a lower level since there were so many retarded deficient and below averages among them. The largest single group will be seen to consist of those who are of average intelligence, that is, testing at from 96 to 105. It will be seen that the groups ascending from average to genius (136-45) correspond approximately in numbers with the groups descending from average to mental deficiency (56-65).

Since the various groups showing different degrees of intelligence merge gradually, each shading off into

the next, it will be apparent that there is no single dividing line between average intelligence and mental deficiency, or between average intelligence and genius. The genius and the mentally deficient are not different psychological types, but different forms of the same type. The percentage of mental deficiency in a nation will depend on the standard that is set up for assessing mental deficients. We cannot call a man tall or short until we have first agreed what an average justifies "tall" or "short."

The common opinion of teachers, that there are far more below the average than above it, is not found to be true in fact. The figures are approximately equal. Moreover it is found that the numbers of average, above average and below average are generally the same at any age. In addition tests carried out on the same children over a number of years shatter another old-fashioned idea, that a standard of intelligence in childhood is liable to great changes in later years. On the contrary, very clever pupils do not, as often supposed, fall away as they grow older; nor do deficient pupils improve greatly under "coaching" and special classes, although removal of physical or social disabilities and bad environment may release repressed abilities. But natural intelligence as represented by a correct I. Q. remains fairly constant. Of course the mental age of a pupil has no point at all unless considered in relation to his actual age. Two pupils, one of twelve and one

eight years may have a mental age of twelve years. The first is, obviously, retarded and deficient in intelligence, while the second is normal.

Sex makes little difference. The intelligence of females is at least as high as that of males. The lack of education opportunity is the full explanation of the smaller number of women in positions of distinction in any country. In India, there is no need to stress this point. There would seem, indeed to be a definite superiority of girls up to the age of thirteen, but a falling off after that. There are some tests of intelligence which suit boys and so they do better in them, such as arithmetical calculation, giving change for money, reversing the hands of the clock, and so on. But girls score more in copying designs from memory, making aesthetic comparisons, answering questions of comprehension. The differences, on the whole, are negligible.

Another much debated point is the extent to which intelligence corresponds to the social and home environment from which a child comes. Tests of British children show that there is an effect. If we take an average home, a superior home, and a poor home, we are likely to find the child from the superior home some 7 points above the average, while the child from the poor home is 7 points below the average. That is, of course, when we measure the homes in terms of culture and ordered social life such as supply a better or worse home background. But the child of intelligence and inquiring working-class

parents is likely to do better than the spoiled child from the ill-run mansion of a degenerate millionaire.

The Intelligence Quotient, as might be expected, is usually found to correspond fairly well to the child's school work. When cases of disagreement are found, often it will be because the actual age of the pupil, has not been taken into consideration. The school authorities too often classify a pupil's work as normal, paying no regard to the fact that he is well over or under the age of the class in which he is working. Such a pupil would, under the tests, be graded as inferior or superior. In this way we will be able to identify children of, say, ten-year intelligence in Classes X, IX, VIII, VII, and VI. As a rule if we find in school that a pupil's mental age fails to correspond with the class in which he works, that pupil is either very clever or very dull. The average pupil is seldom found to be far misplaced. Children showing an I. Q. of 70-80 seldom do good work in the class where they should be by age, but will usually be found retarded. Children showing I. Q. of 120 and over are usually found in classes one or two years in advance of actual age but not, as a rule, so far forward as they should be on a consideration of intelligence alone. That is because authorities often promote on age, rather than on merit, and have a mistaken tendency to keep back the brilliant young pupil.

The tests have been checked individually and in relation to the results of the scale as a whole. For



example, if it is found that ten-year-old children with intelligence above the average pass a certain test consistently in higher numbers than ten-year-old children with intelligence-average, or lower, then that test must be accepted as a reliable index of intelligence. By dint of prolonged research it has been found that all the tests used, including many that have been steadily criticised, have a real connection with intelligence. A number which, on first suggestion, seemed likely to be of value have proved on trial to be less reliable than anticipated, and have been discarded. No single test alone yields sufficient results to come to a conclusion; a great number of tests are necessary in assessment of intelligence. Intelligence has many different sides, and the accidents of training and surroundings may be such that one test is more likely to be passed than another. It is in a large number of tests that a good chance of a reliable assessment lies.

## VI

### *Different Class of Intelligence Quotients.*

We have already mentioned that there is no dividing line between the various degrees or classes of intelligence such as superior, Above Average, Average, Below Average, Inferior. Very often it is merely a matter of definition and depends on the standards we have set up. At the same time, it is desirable to have some agreement on terminology and not to use

names without a fixed agreement of their connotation. On the results of the tests on 1000 unselected American children, mentioned in the previous chapter (and there is no reason for thinking that there is any marked difference in British or Indian adolescents) the following descriptive terms were drawn up:

I. Q.	Classification
Above 140	'Near Genius, or Genius.
120-140	'Very Superior' Intelligence
110-120	Superior Intelligence
90-110	Average Intelligence.
80-90	Dullness (Not feeble-mindedness.)
70-80	Border line-either great dullness or feeble-mindedness.
Below 70	Definite feeble-mindedness.

Of the feeble-minded, those from 50-70 are usually described as morons (or unreasoning automata) and may often be trained to perform manual and unskilled labour fairly well. It will be recognised that the moron who tests at 69 is a high moron and the one testing at 50 is a low moron. Those testing at 25-50 are described as imbeciles and those under 25 as idiots. In practice, no one testing at under 50 will be found in public schools among ordinary pupils; it is doubtful whether any of the border-line groups should be there unless in special classes, for they will gain nothing from ordinary instruction and will retard or harm average pupils. But many border-line cases do find their way into schools, where they are termed

“dunces” and “blockheads,” instead of being recognised for what they really are.

There are, then, many grades of deficiency in the survey of intelligence, ranging from slightly below average to complete idiocy. If we take words literally, anyone under average is mentally deficient, but of the great number of those to whom this would apply, only a small percentage would be described as feeble-minded. The definition drawn up by the English Royal commission on Mental Deficiency is (in substance): “A feeble-minded person is one who is incapable, because of mental defect existing from birth or from an early age, (a) of competing with his normal fellows or, (b) of managing himself and his affairs with ordinary prudence. Now there is no mention here of a degree of backwardness in school work, but rather a degree of social and practical inefficiency. Of course inefficiency or otherwise in the practical affairs of life is affected by other influences, moral, emotional and physical. A manual labourer with an I. Q. of 70 may be on paper distinctly deficient in intelligence, but because of solid temperament and healthy body may manage excellently in the mechanical routine of the duties by which he earns a living. In his own environment and social surroundings, such a man is well up to normal.

The second part of the definition, too, “managing his affairs with ordinary prudence” also depends to a great extent on the social environment. In the down-

trodden and vice-encircled population of a slum city, thousands of high-grade morons would never be thought of as mentally weak, because the standard is so low. Hence it must be kept in mind that the standards we set up by our intelligence tests are those of normal society, and our standards are psychological. But, in short, we must class as feeble-minded to some extent most of those who test at under 70, for we seldom think of deliberately keeping up a section of society as suitable for moron-employment as porters and labourers in mechanical spheres.

Here are some examples of feeble minded children.

(a) Asaf A. Boy aged 11 years, 3 months. From a wealthy but ill-organised home. Had always plenty of money to spend, his family being in a flourishing business as merchants. Had been promoted from class to class till he reached Class 6 but mainly because of his size and age. When tested at Age 9, could not give any correct answer in the date test (2) Arranged weights in any order by guess-work and could not apply his senses to any critical examination of the varying weights, (3) Gave correct change from one rupee when the purchase was eight annas, but failed in any odd number, (4) In repeating four numbers backwards, always made at least one mistake (5) Did not manage to make one fair sentence out of the group of three words, (6) Named eight months correctly but in jumbled order. Finally, was found to have mental age of 6 years

Definitely deficient, and not likely ever to rise above mental age of 7-8 years.

### I. Q. 53.

J. M. Boy of 17 years; mental age on testing, 10 years, 2 months. This boy had two brothers, both definitely deficient and in the border-line category. His father was a very intelligent man in a responsible legal position, but the mother had a definite deficiency in intelligence. Failed to give any response in 1, 3 and 4 tests of the 12 years group. I. Q., about 59. This boy was well-behaved but lacking in all initiative; took no part in any play activity but was easily led into breaches of rules. Two teachers simply thought that he was "very dull" and "should work harder." But he was definitely deficient in mental equipment, and, when I saw him at the age of 20, in spite of intensive cramming he was in the same position and would have yielded the same intelligence quotient. He had simply reached his limit.

K. Rao. A boy of 14 years; his father was a successful vakil. The home surroundings were quite satisfactory; the boy had come to school at the age of 8 and started with boys of 5-6 years. On testing, showed a mental age of 10 years; he was in a class of boys who were averaging 10-11 years. I. Q. about 70. (As there is no registration of births in India, it is never certain what a pupil's real age is, and so there are limits to the exact accuracy of an I. Q. I always

gave the pupil the benefit of any doubt.) Again the teachers agreed that the boy was "dull" or "thick-headed." He was more than that, being a low borderline or moron case, unlikely to improve much on a mental age of 10 years.

A. N. Boy aged apparently 18-19 (his parents could not say with any certainty.) Doing poor work in Class VII. Teachers said that he was "almost up to the average," overlooking the fact that the rest of the class were boys of 13 - 14 years. On testing, showed an I.Q. of 75. (His age was taken as 16 for the test, anything over that being ignored.) At his true age of at least 18, it is probable that he has settled down to a mental age of 12 years and is unlikely ever to develop beyond that. Yet his parents were paying lavishly for coaching and wished to send him to college. He took no part in games, used to stand about listlessly during leisure, was made a butt by smaller boys from whom he had to be protected. Three years later, he was studying entirely under private tutors but had made no progress whatever. This lad was definitely deficient, and to try to drag him through the usual school course was merely cruelty. Yet he wrote neatly, could sing fairly well, and could read aloud without many mistakes, and his teachers thought him "almost average"

Sri K. Boy aged 9 years, 7 months. On testing, showed mental age of 7 years, 1 month. Was in Primary School in Class III, not doing any work well.

Physically healthy but subject to dreaminess and wandering attention, and very slow in comprehending any new point. Writing sprawling and irregular, books and clothing always dirty and untidy. This boy came from a poor family where he had undoubtedly been neglected, but in three years at school did not appear to improve at all; at the end of that period still showed I.Q. of about 75. May reach Class VII or VIII but is definitely deficient in intelligence, and no amount of stimulation will make him, in the words of his teachers, "make up."

In all the above cases, there should have been no disagreement among observant teachers as to the real state of affairs. Yet in several such cases, feeble-mindedness had never been suspected, but every case had been approached as if pressing and extra tutors in spare time could transform the pupils into normal. But none of them should have been sitting in the classes suitable for normal children, and all required special tuition arranged for the defective. About 2 or 3 percent, that is about four or six out of every 200 pupils are as defective as those mentioned. But teachers are accustomed to finding one or two of them in each new batch of pupils coming forward, and just think of them as the normal and unavoidable proportion of "dull boys."

We have seen that border-line cases come somewhere between that class where mental deficiency is clearly recognisable and the higher group classed as

dull and backward but not mentally deficient. Mostly they are doubtful cases and in some instances are capable of improvement, even in a few cases of being raised to average status. It is not possible to say that those of a certain I. Q. are doubtful, because we must keep in mind that other things than intelligence play a part in the conduct of life. Steady nerves and emotions, an industrious nature, and a helpful environment may help the individual with I. Q. of 70 to make a passage through life. On the other hand, a person with I. Q. of 75 or over may be handicapped further by neurotic tendencies, poor health and absence of moral restraints, and so may be in every sense deficient. For example, two boys in the same class, namely IX, were both aged 16 plus. Both were definitely below average and making a poor effort at school work. A tested at 70 and B at 72; their mental age was fairly similar and equal to 12 years. A was of poor parents who were not very ambitious for his future; he left school and made a fair living for himself as an apprentice in a motor garage. In that environment, he would not be regarded as deficient. But B was the son of a headmaster who insisted against advice in cramming at a College course. At the age of 20 he still tested at an I. Q. of 73 (age above 16 being disregarded); had failed completely in an attempt at School Leaving Certificate, and was showing signs of strain owing to the effort to make him into what he was not. In his environment, he was undoubtedly deficient. Thus border-line cases depend very much on finding the



correct environment, and to defy this dictum is to run counter to a law of Nature. Ironically the children of teachers and other educated men are often the ones to suffer. Here is a typical border-line case quoted from Professor Terman.

M. P. Boy aged 14; mental age, 10-8; I. Q. 77. Has been tested four successive years, I. Q. being always between 75 and 80 in school nearly 8 years and has been promoted to fifth grade. At 15 was doing poor work in the sixth grade. Good school advantages, as the father has tried conscientiously to give his children "a good education." Perfectly normal in appearance and in play activities and liked by other children. seems to be thoroughly dependable both in school and in outside work. Will probably become an excellent labourer and will pass as perfectly normal, notwithstanding a grade intelligence which will not develop above 10 or 12 years.

This shows one point, that in western countries there is mostly scope for the border-line cases in the ranks of manual labour, where a good artisan is a respectable member of society with a reasonable standard of living. But it is sad to confess that in India we have not yet a proletariat, a class of workmen with a good social life and held in respect for their contribution to the welfare of the community. Labour is to a great extent degraded by being left to an illiterate and backward class, so that the problem of the border-line case born of respectable parents is

more acute in India, and such a child will hardly escape a well-meant effort to push him through the usual high School and College course.

It might be possible to make out another class, normal but dull, or, as it is sometime described, poor average. There are many in this class, and it would be wrong to describe them as feeble-minded, but they are just so far below normal in intelligence that they cannot quite keep up with the ordinary work and problems of the intellectual side of school life. They will be found in the group testing at about 80, say from 75-85. Here is a case:

K. R. Boy aged 10 plus, (exact are uncertain)  
I. Q. 84. Tested two years later, I. Q. 80. This time, his mental age was 11, which does not seem too bad since his real age was no more than 12-6. At this age he was rather backward in class IV; he was satisfactory in general character and in habits. Teachers thought him perfectly average, but was always behind the others in the class for which he was already over-age. In spite of special attention, he had not improved on this position at the age of 14. He is not feeble-minded; there is nothing wrong in his home environment. He is merely dull, and will not be well-advised to try to advance beyond Class VIII, which standard he may complete after one or two failures. He could probably do better in a special class for similar students who require to advance more slowly than the normal pupils; but few districts have such provision.

The pupils testing at 90-110, or average students, offer few problems and usually go through life without great successes or failures, except that in their case family influence and wealth often elevates them into positions not attainable by poorer pupils with richer intelligence. Some 60 per cent of all school children test between 90 and 110, though it is obvious that the top and bottom of this range might be described as high average and low average. Such types are so recognisable that to give cases is unnecessary. Of average children, however, the lower range does not always fit well into higher education. For example, Tej, in his last year of High School tested at I. Q. of 92; he had to appear a second time before passing School Leaving Certificate. He did poor work in Intermediate Science in College, but in his Intermediate Examination passed in physics and failed in Chemistry. On repeating the whole examination, he passed in Chemistry but this time failed in Physics. He was a tireless worker, spending hours far into the night in reading. Such students are common enough; they usually get a low degree in one or two years above the normal course. The system is at fault which demands this qualification, when other and more practical courses of instruction would get far more out of the low-average student.

Superior intelligence, or pupils who at school test at 110-120 naturally make better progress than the average, and are usually definitely recognised at their proper value. Professor Terman found this class to

be five times as numerous among children of superior social status as among the poor. This does not seem to hold good in India, where often riches lead to neglect and pampering of families, and the children of the well-to-do are regarded as being exempt from the normal discipline and need for regularity. In any case, such above-average pupils are plentiful enough in our schools, and are often enough prevented from doing better by being tied down to the rate of progress of the average child. It is with children of exceptional intelligence, those testing at 120-140, that the difficulty lies, for they are often not recognised, or are kept back in deference to a mistaken idea that promotions and accelerated progress will entail physical harm. About 3 per cent will be found to test at 125 or over. They will often be found advanced one year, or even two, in their classes, and unusually get the highest places in class work. Professor Terman writes: "The 120-140 group is made up almost entirely of children whose parents belong to the professional or very successful business classes. The child of a skilled labourer belongs here occasionally, the child of a common labourer very rarely indeed." Such children are seldom allowed to advance in school at the pace which would be natural to them. They are often found among children of their own age, where there is little incentive to do their best and honours come too easily. Sir C. V. Raman was found fit to enter College at 12 years; many children of 14-15 attain that progress. Here is a typical case:

N. Ali. Age 9 years, 1 month; mental age 11 years, 3 months. I. Q. 129. Father (dead) had been an accomplished oriental scholar. Was given too much attention at home and mother sent him to school rather unwillingly; physical health very good. Absorbed all new work without effort or repetition; was quiet and modest in behaviour. Played games with keen spirit and average skill. In spite of irregular attendance was two years in advance of his age, and always took a high place in his class. With regular attendance could have been fit for College entrance at 14.

I. S. Hindu boy aged 10 years 4 months; mental age 13 years, 10 months; I.Q. 133. Son of a father who had done well in studies though he had not made further use of it, being a landowner. Was two years in advance of the stage to which his age entitled him, and then taking a high place, especially in mathematics and science subjects. Did not work hard, but could miss a week's work and then make up arrears in mathematics in a single lesson. A lazy genius; had he been under the necessity of making his living, might have had a great career. Normal in conduct and above average in games. Capable of leadership and liked by playfellows.

There is a curious and groundless idea that clever children are freakish or unbalanced in some respects. Experience does not bear this out. The small percentage met with who tested so highly as to come under

the category of "very superior intelligence" "genius" were superior to the average in moral qualities, physical activities, and leadership. They were usually more popular and likeable than the average; on the contrary, the small amount of unpleasant offences coming under attention, such as will be found in almost any school, in the way of thieving, indecency, etc., were invariably brought home to pupils below normal in intelligence. Moreover it has not been found that the high results and good work of the pupils with a high I. Q. have been due to home coaching, extra tutors, and so on. Most of them shone by sheer innate ability, by natural mental powers, and in many cases the high level of intelligence which these boys possessed had not been fully recognised by either parents or teachers. It is just as common for a teacher to overlook the high intelligence of an unduly young pupil in his class as it is for him to overlook the deficiency in an over-age pupil.

We have to attack another fallacious idea, that in many cases very clever pupils are merely "bookish" and may be lacking in some personal qualities necessary for success. This is the familiar error of confusing native intelligence with results obtained in school examinations. But very often examination results arise from intense memorising, cramming, successful anticipation of likely questions and the like. In fact certain pupils who by such methods obtained consistently high marks in examinations did not show a

correspondingly high I.Q. in the intelligence tests. Of all the pupils I encountered in period of fourteen years who showed exceptional intelligence, only one failed in the practical side of life. He took exceptional marks in every school and college subject, but had no interest in games or any other school activities. He failed as a teacher to impart his knowledge to others, or to keep any control over his classes. There was a distinct deficiency of the will in this case; his abilities might have been quite successful in some other branch of life.

## VI

### *The Scale as a Practical Method*

The Binet Simon Scale is more accurate at arriving at an estimate of a pupil's mental powers than the estimate of the most experienced teachers. It has come to be recognised as the most reliable index of intelligence; and is in many countries a basic part of the educational system. Tests actually probe and ascertain the general conditions and development of intelligence, and not merely chance scraps of knowledge which the pupil may by good luck possess. It is speedy and reliable. A teacher with knowledge of the method can in forty minutes arrive at a more accurate estimate of a pupil's intelligence than one without the method would form after months of unscientific observation. There is all the difference that there is between estimating a man's height by guess and measuring it with a graduated yard-rule.

At the same time, sound experience and training to the method of applying the tests is required. This does not mean that the work can only be done by a thoroughly trained expert in psychology, and it does not mean that anyone can use the scales after a brief study but a good and enthusiastic teacher, taking pains to study the scales and collaborate with others in comparison of results will soon find that he has a better instrument at his disposal than ever before. To watch an experienced examiner in action is essential, and to make several tests, under his supervision, on children whose mental capabilities are already known. In America, a six-months' summer school is reckoned as long enough to equip an experienced teacher with this knowledge. It is above all things necessary to follow absolutely conscientiously the instructions laid down. Indeed we must discard the idea that the recognition of deficient children is a part of the duties to be performed by a medical officer. There is practically nothing in the usual curriculum of medical Colleges to equip their graduates with such knowledge. It is part of the duties of a teacher, and cannot be passed on to the school medical officer.

Naturally the teacher conducting an intelligence test is responsible for establishing touch with his pupil and satisfying himself that the response given is likely to be the best that the child can give, and that there is neither fear nor nervousness. It is much more likely that the teacher, a figure already familiar to the pupils, will accomplish this than the more seldom seen



medical officer or other outside examiner. If there is obvious nervousness or indisposition, the test should be postponed.

Some have supposed, on the analogy of ordinary examinations, that once the tests have been used on a few subjects in a school, the nature of the tests will become commonly known and the pupils will come prepared with the correct responses. It has been shown by experience, however, that only in a few of the tests is this likely to happen. The total number of the tests is large, and there is no printed paper to carry away. The average pupil can carry away with him only a limited memory of all that he has experienced; such tests as repeating sentences, numbers, copying designs and figures, comparing weights, interpreting pictures, and others do not lend themselves to being memorised and repeated to others. Certain such as the ball and field test, giving the date, reversing hands of the clock, &c. might happen to be remembered and repeated, but the degree to which this has been found to happen is such that it need not be taken seriously. Up to 10 years, the possibility may be said hardly to exist.

The question then arises as to whether it is possible to use the same set of tests on pupils who have had them one or two years previously. Again this is to some extent dependent on the age of the pupils and on the period which has elapsed since the previous testing. Pupils of superior intelligence, especially

those of 12 years and over, would probably tend to recollect the items to some extent. But with children of deficient intelligence, it is found that the repetition of the same set of tests yields constant results, and even those of average intelligence do not seem to become familiar with the tests if repeated at annual intervals. It will, on the other hand, be found almost invariably that after the interval of a year, the average child has advanced in mental age by a year. If the interval between the tests is two years, there is practically no advantage remaining of having been over the ground before.

One criticism has been frequently made, namely that ability to respond in several of the tests is due to the accident of home or school environment, that one child has been in circumstances where the responses would be acquired, while another has not. Naming coins would be more familiar as an exercise to a child habitually in possession of coins; naming colours would be easy for a well-to-do child possessing a paint box; tests of vocabulary would favour the son of educated parents where conversation is on a higher intellectual range. It cannot be gainsaid that the children of parents where in superior social position tend to test more highly than the offspring of uneducated and labouring classes. But every investigation that has been made in this connection shows that the performance is more the result of natural mental superiority than advantage of environment; the

family in superior circumstances is more often so fortunately placed because of ability and high character than because of good luck, and bequeath to their offspring superior powers as well as superior facilities. Ability and lack of ability are hereditary. That is not to say that there is advantage in superior home and school environment, for a child living in restricted circumstances, starved of intellectual food, repressed and neglected, is at a distinct disadvantage and receives no opportunity to develop in the field of intellectual growth. But here we are dealing with ordinary cases and ordinary differences in environment, and there is no reason to think that they play a large part in the growth of intelligence. Children from poor families, who have been taken away from slums where they have been living in poverty and neglect, are taken to institutions where they are given a good environment and scientific training. Yet they never afterwards compare with the general level of the pupils in a good class school for the children of parents in a good position. Heredity can not be neutralised in one generation. At the same time, innumerable cases turn up which defy analysis. The sons of a prominent public man of the highest rank and ability were studied. Two were normally bright, even above average; three, by a different mother, were all definitely deficient. A single member of an otherwise dull family may show superior intelligence or even genius. There is no true guidance for the causes underlying all this; but superior intelligence is always

revealed by the tests, as is feeble-mindedness, no matter from what type of home the pupil may come.

## VII

### *How to use the Tests.*

In the lower years, most teachers think the tests so trivial as to mean little, but even the simplest are real tests to the young child, and call for a certain amount of effort and concentration. Thus even at the three years' test, steps must be taken to test in an atmosphere which will guarantee that every opportunity is given to make the best response possible. Keep in mind that the power to attend varies greatly, and that in dull children the attention wavers. Attention or concentration can never be at its best if there is any physical disability, or if the child is nervous, embarrassed or afraid. The tests will be best handled in a small and quiet room, simply furnished and preferably already familiar to the child. No other persons should be present, particularly strangers, since they are likely to cause nervousness and self-consciousness. It is much better if the teacher conducting the tests is already known to the child and is liked by him; if an assistant is to be present to record the scores the same holds good. Terman's findings provide for an external examiner, and he says: "the presence of parent, teacher, school principal, or governess is to be avoided. Contrary to what one might expect, these distract the child more than a

strange personality would do." I am not able to discuss this since my own personal experience is nothing to set against a finding established by a vast amount of careful experiment and research. Nevertheless I have found that my own pupils, with whom I have been on friendly and easy terms, have done their best in the efforts I have had them make for me, but children to whom I was strange have tended to be shy and non-responsive. Certainly there should be no critical attitude from any spectator, and absolute silence must be kept if other are to be present. An interruption of any kind cannot be allowed; it tends either to distract attention or else to give a hint as to what the correct response should be. For the purpose of instructing teachers and learners in handling the scales, it is sometimes necessary to give a demonstration test. For this purpose children should be selected who are not likely to be nervous, and the examiner should be a person of tact and capability. But there will often be an element of doubt about results obtained in the presence of witnesses.

Naturally the examiner must in the beginning assure himself that the child is perfectly at ease, and take all steps to bring this about. How this is to be done depends upon the nature of the subject and the methods of the examiner, and if necessary a few minutes should be spent in gaining the confidence of the pupil. An informal talk about games, the scout troop, or in the case of young children, about some

interesting picture or toy may help in establishing friendly relations. When the youngster is chatting in a friendly and natural manner, the talk may pass almost imperceptibly into the opening test. A little praise will go long way in securing the necessary confidence.

When once the test has started, do not show impatience or dissatisfaction with any response, no matter how unsatisfactory it may be. Even if an answer is exceedingly poor, the examiner should appear to be quite pleased with it and should pass over errors without remark. If the mistake is obvious even to the child, pass it over by saying, "Perhaps you are not old enough to know that. But never mind, you are doing quite well." An occasional "Well done!" or "Very good!" is desirable, when any reasonable response is given. Any remark is justified which keeps the child comfortable in mind and interested in what is going on. The opening tests should always be fairly easy, so that successful performance of them may bring about the confident feeling that is so desirable. But children differ so widely in temperament that no fixed procedure can be laid down as to what the examiner should say or do; there must be a certain margin left to the judgment of the teacher or examiner. One child may be nervous, another sulky, and another mischievous, and the tactful examiner will adapt himself to the varying needs. There are certain persons who are good examiners, and others who will

never become so. Properly approached, the tests will not be regarded as a little extra school work, but rather as a novelty of interest and recreative value.

The time required to test is, approximately : for 4-5 years, 30 minutes ; for 6-7 years, 35 minutes ; for 7-8 years, 40 minutes ; for 9-10 years, 45 minutes for 11-12 year, 50 minutes ; for 13-14 years, 55 minutes over 14 years, 60 minutes. In practice, a bright child will be finished with before the suggested times and a deficient and tardy child will probably require longer. But slowness of response and hesitation has often been known to go with a high I. Q. so it must not be assumed that slowness is an inevitable sign of deficiency. If it is possible to hurry on the pupil in a goodnatured manner without upsetting him, a tactful examiner will do so. But if the test seems unduly prolonged to the extent that fatigue and boredom are evident, it is better to close down for an interval, or even to postpone the unfinished part to another day.

All articles required for the test should be ready and in proper order. Pictures, designs to be copied, and colours should be mounted on adequate cards ; sentences and series of numbers should be kept similarly. A pupil should never be kept idle while the examiner hunts for some missing article. No remark should be made on failures, and the examiner should not tell the pupil what the correct response should have been. The aim is to test and not to teach.

Start, as a rule, with the tests which are just one year below the child's age, unless there is a good reason for believing that he is a definitely deficient type. If that group is badly done, it may be necessary to go down the scale and give the tests of a lower group. If, however, the opening group is done satisfactorily, go up the scale to the next higher age group, and continue doing so until we come to the group in which the pupil can do none of the tests. This represents the thorough application of the scale. In practice, however, if the bright pupil fails in all save one of the tests in a particular group, it would not be thought necessary to take him to the group above that. Similarly it will be possible, in the case of bright children, to go no lower down than the group in which there is only one failure. But in the case of deficient, they must be started at the group where there is a complete pass, and taken up the scale till there is complete failure.

The tests have been arranged in the order in which it is usually best to apply them, but the examiner need not hesitate to depart from this order if he finds good reason for doing so. Such tests as naming a number of words, pointing out differences or similarities, are not suitable for opening a test as they might create nervousness and consciousness. If a pupil is obstinate and silent when asked for a test of memory, repeating numbers or comprehension, the examiner may tactfully shift to something more novel and interesting, and return to the more "dry" tests when



a good atmosphere has been established. Some children dislike certain tests and others have different dislikes. In all cases it is better to try a change before registering failure.

On the other hand, there must be a strict limit to the amount of coaxing and pressing that is to be placed on the child under examination. It is impossible to put too much stress on this point. We all know the natural attitude on the part of many examiners during an oral examination to help the subject out as possible, even to give part of the response in the hope that thereby the rest of it may come. There must not be the slightest suggestion of anything like this, otherwise the test is quite worthless. The questions are purposely framed in such a form that they can be well understood; in fact it may be said that to understand them is part of the test. In written examinations and in ordinary oral examinations, it is well recognised that one examiner is "strict" and another "lenient"; in the tests there must be absolute uniformity. Coaxing and explaining the question often pass into suggesting the answers. The tests are standardised; so is the method of applying them. It will not do to frame the test in slightly different wording, and no departure can be allowed from what has been laid down. To leave out or add a single word may make a difference.

The method of applying every individual test must be studied and practised fully before the exami-

ner uses it for practical purposes. As with most thing perfection will only come with much practice, and possibly be bought by some errors. As a general rule, it may be laid down that the question is to be put in a direct and clear manner, and nothing added to it. If there is any question of it not being understood, the question may be repeated as before, but in no way amplified, and this is to be done as seldom as possible. If unforeseen circumstances arise which have not been provided for, then the examiner must exercise discretion and common sense.

The records of a test must be kept in full detail, and when a test consists of several parts, the score of each part must be recorded. It may be necessary to refer back to it in the summing up of the final result. It makes a difference whether a child just passes in the minimum requirement of a test or passes with more than is required; similarly it matters whether a failure in another test was in all the parts or in only part of them. A record should also be kept of the time taken in each case. It is enough to write "pass" or "fail," and it is better if the complete response can be written down. The test is a written document which is to be kept for future reference, perhaps even by the headmaster of another school to which the pupil may subsequently move. To keep simply the result of the test is no more reasonable than it would be for a pupil to show his mathematics master the answer to a problem and say that he had not kept the steps of working out. With experience the examiner will not

find it unduly difficult to report word for word the pupil's responses, though he should not try to do so if the writing down either delays the test or embarrasses the pupil. If the latter is the case, then he must content himself with writing P or F, for pass or failure. A good pass will be P+ and a bad failure F—. If some success is achieved, then  $\frac{1}{2}$  P is allowable, but this should be used as sparingly as possible. At any rate, the score for each test must be written down at once, when it is fresh in the mind of the examiner, because scoring is not a mechanical affair and the fresh impression in the mind must be confirmed at once. There must be no question of postponing judgment in one test till it is seen what the pupil will do in a further test. The test must be marked finally and on the spot. It will possibly be of use to make notes on the child's answers and reactions as the test proceeds, and the scoring form should have margins suitable for that purpose.

The examiner fresh to the use of the tests will find that a child does not pass all the tests of one age-group and fail in those of the next higher group; sometimes the successes and failures are distributed over several different years. Intelligence is not an even quality, and sometimes a pupil has one kind of intelligence and is lacking in another. Moreover it is impossible to eliminate entirely the factor that some good-luck of experience or training has made it possible for a certain pupil to pass in a particular test,

while another not equally fortunate in that respect may fail. This is not in contradiction of what we stated in the beginning, that the tests in the main are dependent on intelligence and are not tests of accidental knowledge. That is to say, there may by fortunate chance for a pupil come an element of luck in some single test which happens to coincide with part of his home or school training; but there will be no such sustained luck in a large numbers of tests which call for different kinds of intelligence in different spheres. As we work up the scale, it is usual to find that at last the subject fails one or two tests of a group and then in more than that in the next higher group. In the long run we come to a group in which he secures no passes and the tests are obviously too high for him. But owing to the possibility of uneven intelligence which we have mentioned, it has been known for a pupil to fail in several or most tests of a group, and then to pass in the most of the tests in the next higher group. He should be given credit for this, and allowed to continue. This method on the whole, gives a sound indication of the general level of intelligence.

Since we can never rule out of consideration the other factors which are liable to affect a child's mental life in addition to natural intelligence, note should be made during the test of those other factors and they should be given consideration in striking the final balance. For example:—

- (a) Social position. (Low, fair, average, good high.)

- (b) The teacher's own estimate of the child's intelligence, as expressed in the same five grades as in (a),
- (c) Number of years spent in school, whether attendance regular, how many changes of schools, promotions, retardations.
- (4) Nature of school work, (the same 5 grades),
- (5) Any physical defects known to exist; adenoids, bad tonsils, deafness, short-sight, etc. Any bad moral traits.

The general remarks of the examiner should give some information of the child's general attitude to the testing expressed in conduct and emotions displayed. The judgment and insight of the examiner are powerful factors in coming to a final conclusion, and the tests must never be thought of as mechanical and superseding balanced judgment.

The alternative tests in each year-group are therefor used in emergency; perhaps a regular test has been spoiled or allowed to leak out prematurely, and so the alternative tests is brought in instead. But this is the only circumstance in which the alternative test is to be used. It is not to be tried in place of a regular test in which the pupil has failed. An alternative test, however, might be given in a case where a pupil laboured under a certain disadvantage, eg. if the testing was being done in English with a child who

was not very familiar with English, then the vocabulary test would be severe and might be replaced by an alternative test. There must be some reason such as this; otherwise the child who remains silent and does not attempt a test should be given a failure.

The reader will have seen that the first age-groups have six tests each, and each counts two months in assessing mental age. The eight tests in the twelve-year-old group count as three months each and the six tests of the fourteen-year-old group count as four months each. In testing, we had to find an age group for our starting point in which the pupil passed all the tests. He should be credited, for mental age, with all the tests below that starting point, and then to this we add to his mental age two months for each test passed successfully up to and including the 10 year group, three months for each test passed in the 12 year group, and four months for each test passed in the 14 year group. (We shall not consider the higher age-groups of "average adult" and "superior adult"). Here is an example for guidance. A. B. passed all the tests in age-group 6 years, five of the six tests in 7 years, four of the tests for 8 years, two of those for 9 years and one in the 10 year group. His record is, then:—

Credit for all groups before 6 Years,	5 Years 0 Months
„ „ 6 tests of Year 6 ( $6 \times 2$ mths)	1 Year 0 Months
„ „ 5 tests of Year 7 ( $5 \times 2$ mths)	0 Year 10 Months
„ „ 4 tests of Year 8 ( $4 \times 2$ mths)	0 Year 8 Months

„	„	2 tests of Year 9 ( $2 \times 2$ mths)	0 Years	4 Months
„	„	1 test of Year 10 ( $1 \times 2$ mths)	0 Years	2 Months

Total earned,                      8 Years.

Thus the mental age of A. B. is 8 years. By considering his real age, which is 8 years, 7 months, we get an I. Q. of 93, and classify the pupil as "Average."

Here is another example. C.D. tested as follows:—

Credit for Years 1—8.	8 Years	0 Months
Six passes in Year 9 ( $6 \times 2$ mths)	1 Year	0 Months
Four passes in Year 10 ( $4 \times 2$ mths)	0 Year	8 Months
Three passes in Year 12 ( $3 \times 3$ mths)	0 Years	9 Months
One pass in Year 14 ( $1 \times 4$ mths)	0 Years	4 Months

Total earned                      10 Years 9 Months

The pupil C. D. is 13 years, 9 months in age. Thus his I. Q. 129/165 of 100. I e. his I. Q. is 78 and the pupil just falls below dullness, a high border-line case. (That is, unless from a study of all other circumstances the examiner has reason to attribute the low scoring to other factors such as illness, physical disability or long neglect of instruction )

It may be that a test has to be hurried, though it is better not to undertake the work if such is the case. However if it is so, and not all the tests can be given in the time available, then higher value should be given to the ones which are passed. That is, if in a test pupil is only given four of the tests in age-group 10 years instead of the full six, and passes

in three of the four, then tests should be valued at three months each instead of two and he should be credited with nine months.

It only requires a little thought to see that the difference between mental age and actual age is more significant with very young children than with those of more advanced years. If a child of five years shows a mental age of four years, that is a deficiency to the extent of 20% of actual age; if a boy of ten shows himself to have a mental age of nine years, the deficiency is only 10%. In the case of the five-year-old, the deficiency means definite backwardness possibly amounting to feeble-mindedness; in the case of the boy of ten, it is just a little departure from the average. The child who is found at the age of five to be deficient by one year will at the age of ten be deficient by three years, in all probability. As we have seen, the Intelligence Quotient is arrived at by dividing mental age by real age (after reducing both to months). In the case of a teacher doing much calculation, a ready-reckoner will save a good deal of time and calculation.

The test have led us to the conclusion that natural intelligence improves little, if any, after the age of 16 years. Some have argued for a later age, but the mass of opinion points to this figure. It means that, in calculating the I. Q. of any subject over 16, we ignore the extra years and assume him to be 16 in our calculations. That is to say, if we are testing a lad



of 19 and another of 17 years of age, in our calculations we look on both as being 16 years old. If they both show a mental age of 13 years, the quotient in each case is 16/13.

For use in the Stanford revision tests, there are regular Stanford record books. They contain squares and diamond figures for copying, a round field for the ball and field test, lists of words for the vocabulary tests, moral stories and sentences, lists of numbers, reading selections, arithmetical problems and so on. It is hoped that in the near future this booklet may be translated into Urdu and other Indian vernaculars. For any using the tests in English, the booklet may be obtained from the well-known publishers, Messrs George G. Harrap & Co Ltd. Such apparatus as the graduated weights may be made in the science room of any school, or indeed in any room, keeping in mind that the weight must be similar in size and external appearance. Even if they are not to be procured, a fair test may be made by a keen teacher with material that is entirely home made. I have used ordinary match-boxes.

## VIII

### *(Instructions for Particular Tests.)*

#### THREE YEAR GROUP.

- (1) Pointing to parts of the body. Show me your eye, nose, mouth, hair, etc. When

sure that the child is attending to you, say, "Show me your eye-nose-mouth etc." If the response is not at once forthcoming, try "Put your hand on your nose, etc." Young children are shy and sometimes several efforts will be met with a blank silence; then all at once a pleasant remark will dispel the restraint and all the responses will be smilingly given. Professor Terman recounts the case of a little girl who would make no response, but at once responded correctly when allowed to use a large doll for the purpose of the test.

*Scoring.* Three answers out of four must be given correctly. In the case of small children, use some discretion. For example, if in the test "Touch your mouth," the child opens his mouth instead of touching it, showing that he has understood, that may be accepted as a correct answer. The object is to ascertain whether the pupil understands simple language, an important point in estimating intelligence. It is a very simple, but very basic test. It is necessary to be sure that failure comes from pure inability to understand language, and not from obstinacy or shyness.

- (2) To name familiar objects. Have ready a pencil, coin, watch, egg, and key. (Not

a Yale key, But one of ordinary type.) A one anna piece will serve for the coin. Simply say, "What is this?" or "Can you tell me what this is?"

*Scoring.* There should be three correct answers out of five. Each object must be correctly named; it is not enough to take up the object and use it. Use some discretion; if the watch is described as "a clock" that may be accepted, but "pen" instead of "pencil" would not be passed.

This test shows whether the child can associate very familiar things with their names. It tests basic and very simple mental processes, and any deficiency in this test would show a distinct lack of mental equipment. There is no child who should not be able to name three of the above objects, even from a poor home. Do not vary the list of objects as they are standard in most places.

- (3) Enumeration of objects in pictures. In Western countries, three stock pictures are used, "A Dutch Home," "River Scene," and "Post Office." If pictures can be prepared of an Indian post office, they will do quite well. Say, "Now, I am going to show you a picture." Then hold up the first picture and say, "Tell me what you see in this picture." If there is no answer,

probably owing to shyness, say, "Look at this picture and tell me the things you can see in it." If there is still no answer say "show me the cat.....dog.....table...", naming some one article in the picture. This may be done with only one article, in order to give a shy child a start, but only one, at the beginning of the test. If the child answers correctly, say, "That is good. Now tell me all the things you see in the picture." Further stimulation should not be needed. If the child names one or two objects and then stops, say, "Can you see any more?" Then go on to the second and third pictures.

*Scoring.* For a pass, the child must name three things in any one picture without further coaxing after he has once started. It is enough simply to name them; anything fuller is unlikely but is equally acceptable.

This is to test whether a familiar object in a picture is recognised and associated with its name. It has a good deal in common with the preceding test. Always use the pictures in the same order for the sake of uniformity. Some appeal more than others; some invite enumeration and others description.

- (4) To state sex. "Are you a little boy or a little girl?" To a girl, the question is the

same with "girl" in the first place. If no answer from a boy, say, "Are you a little girl?" *vice versa* with a girl. If the answer is, "No" then say, "Well, what are you?" The scoring answer must be direct.

*Scoring.* The answer will pass provided it is direct and shows that the pupil has really decided between the two possibilities. But "yes" or "no" cannot be accepted as a final answer. This test is not so simple as it appears and plenty of three-year old children hesitate and cannot answer it, because they are unable to discriminate between those two common class names.

- (5) To repeat six or seven syllables. Begin by getting the child to speak. Can you say "mother?" Now say "good dinner." Now say, "I have a little dog." Speak slowly and clearly, but do not exaggerate the slowness. If no response, the first sentence may be repeated up to three times. Then give the other sentences without any preparation, "The dog runs after the cat," and "In summer the sun is hot." It will be found more difficult to get the child to try here; if that is the case, Professor Terman allows the substi-

tution of the alternative test of repeating three numbers.

*Scoring.* A pass consists in repeating any one sentence without error after a single reading. Do not trouble about mispronunciation as long as there is no change.

One does not expect a child to be able to use such sentences in its ordinary talk, or even to know the meaning of all the words. It calls for a memory of six syllables with fairly familiar language sounds. Such children are always developing by remembering and imitating the speech heard around them. Such remembering and imitating is necessary in learning language. The definite cases of low feeble-mindedness do not progress far in this department.

- (6) To repeat correctly three numbers. Ask, as a preparation, for two numbers. Say "Say 4-2." Now say to him in the same voice, "Say 3-6-2. Now say 8-5-3." Speak in an ordinary voice, slowly but not too slowly.

Children sometimes fail to answer owing to shyness. In that case the first set of numbers ( and the first set *only* ) may be repeated several times, but a correct answer given to the first set in such a case is not counted in scoring. Further sets are to be read only once.

*Scoring.* The test is passed if the child repeats any one set absolutely correctly after a single reading.

#### FOUR YEAR GROUP.

- (1) Comparing lines of unequal length. Give the child a card showing two lines of unequal length, drawn horizontally. Point to the lines and say, "Look at these lines. Tell me which is longer. Put your finger on the longest one." We use "longest" as well as "longer" although there are only two lines, because young children are sometimes more familiar with this than with the comparative of the adjective. If no answer is given, say, "Show me which line is the biggest." Then take away the card for a few seconds; then show it again in a different position and say, "Now show me the longest." Change the position again and do it a third time.

*Scoring.* The proper line must be shown each of the three times. If only two attempts are correct, the whole thing may be repeated three times and full credit given if the three fresh attempts are right. Thus the standard required is three right out of three, or five out of six. But no departure is allowed from this.

Sometimes the child points vaguely and without particular direction. If so, attempts must be made to get him to be more definite by repeating the attempt. Success depends rather on ability to understand the instructions of examiner than in actual critical comparison, for the lines are such that there is a clear difference in length. A certain ability to attend for a number of trials is also called for. Deficient children in particular wander in attention after one or two trials, and all young children tend to do so to some extent. So many a failure is caused by inability or unwillingness to concentrate on a few consecutive efforts, and this is a weakness which if in excess is diagnosed by this test.

- (3) To count four annas. Place four anna pieces before the child in a row. Say, "Look at those annas. Count them and and tell me how many there are. Count them with your finger, like this," (starting on the right) "One!.....Now go on." If the pupil gives the number, rightly or wrongly, without counting, say, "No, count them with your finger like this," and start him again at "One." Make him count aloud.

*Scoring.* The test is passed only if the coins are counted and pointed from one to four. No score for merely stating the correct number.



This is not, as might appear, only a test of class room arithmetic. All children have a chance to learn counting up to four, even without going to school. More is required here than mechanical repetition of 1-2-3-4, and often a child who can repeat the four numbers fluently is not able to use the knowledge in counting four familiar objects. In fact some examiners have wished to place this in the five-year group.

- (4) Copying a square. Place before the pupil a card with a heavy black square with sides about  $1\frac{1}{4}$  inches long. Give him a pencil and say, "You see this? (showing the square) I want you to make one like it. Make it here (show him where to draw). I know you can do it." Keep to these words.

Many children are unwilling to attempt drawing as a test, and some inducement may be needed. Give three trials, saying each time, "Make it just like this." See that the child is in a comfortable position with his paper firmly fixed before him.

*Scoring.* The requirement is that at least one drawing out of three is as good as these indicated as passes on the model score card at the end of this book. Almost invariably the child will produce an effort much smaller than the model, but this may be disregarded. There should be a

rough idea of four sides and four right angles. The commonest failure shows a vague formless enclosed figure with no definite division into sides and angles. Provided there is some success in this basic idea, be liberal and do not be afraid of roughness and irregularity. After the three efforts, say, "Which one do you like best." Here we get a glimpse of the power of self-criticism, which is not great at this age but in the mentally deficient is usually entirely lacking. It is a bad sign if a pupil expresses satisfaction with a very poor effort.

Note whether the child makes the square side by side, looking at the model the while, or makes a dash at it after a preliminary look. Very young or deficient subjects tend to the latter procedure. As a rule, 75% of children of four years pass in this test. Pen and ink must not be used and one success only is necessary. Success does not seem to depend on previous instruction in drawing, though of course that would help. It requires rather the power of perceiving the square as a whole and linking up the visual impression with certain motor activities. The nerve-muscle coordinations should be sufficiently trained at this age for this to be done. The diamond may not seem much different from the square in difficulty, being also a four-sided figure, but tests show that it is definitely more difficult and a test for seven year intelligence.

- (5) Test of comprehension. After making sure of attention, ask the child, "What must you do when you are cold?" If there is shyness, repeat several times in a friendly tone, but do not in any way vary the wording. Allow 20 seconds for an answer. In the same way go on with, "What must you do when you are thirsty?" "What should you do when you are tired-sleepy?"

*Scoring* There should be two correct responses out of three. There is no single answer, but anything reasonable may be accepted. For the first, the "cold" question, we may get "Put on a coat," "Sit in sun," "Run about to get warm," "Go before the fire," and so on. For when the child is thirsty we may accept, "Drink water," "Drink some milk," "Ask my servant for a drink," as all near enough to the point. It will be found that failure consists, as a rule of silence or some definitely pointless answer.

The object is to test whether the child can comprehend the questions and give a simple sensible response. The test is usually managed by the average child of four.

- (6) Repeating four numbers. Say, "Listen to me. I am going to say some numbers, and then I want you to say them. Now attend:

5-7-4-9"; then the same with other two sets, 2-6-5-4 and 9-2; 6; 3. The examiner should pronounce the numbers slowly (taking about 4 seconds) If the child remains silent, the first set may be repeated a number of times in order to get an answer, but this answer will not then be scored as a pass. The second and third sets may not be given more than once.

*Scoring* The test is passed if the pupil repeats one set correctly after hearing it once.

Again in practice it has been found that some 75 % of children of four years pass this test.

(Alternative Test) Repeating sentences of twelve or thirteen syllables. The three stock sentences to be used are:

- (a) This boy's name is Ram. He is a very good boy.
- (b) When the train passes you will hear the whistle blow.
- (c) We are going to have a good walk in the field.

After making sure of the child's attention, start him speaking on shorter phrases. Ask him to say, "Where is the cat?" and "I see a motor-car." Then go on, "Say this....." and read the first sentence

in a natural way. If the child is shy and does not respond, or seems puzzled, the first sentence may be re-read, but then the answer is not allowed to score. With the second and third sentences, there may be no second reading.

*Scoring*     The test is passed if one sentence is repeated correctly after being read once. Do not trouble about mis-pronunciations or indistinctness, as long as words are not changed or left out. Naturally this could not be applied to Indian boys of four only learning English for the first time, but the sentences would have to be in the vernacular of the pupil.

#### FIVE YEAR GROUP.

- (1) Comparison of Weights. Two weights are required, exactly the same in shape and size, weighing 3 and 15 grams. If desired they can be made of stiff cardboard pill-boxes about  $1\frac{1}{2}$  inches in diameter, and filled with cotton wool and lead pieces to make up the weights. But the lead must be so padded by the cotton that it will not rattle, and the lids should then be firmly fastened on. A chemist will often help to make and weigh the boxes. Match-boxes may serve.

Place the two weights on the table and say to the child, "Do you see these boxes? They look the same, but one is heavy and one is light. Try them and tell me which is the heavy one." If there is no answer, try again, saying, "Tell me which box is the heaviest." (Remembering that some children know the-est form of the adjective better than the comparative.)

Sometimes the child quickly points to one of the boxes without making any trial of them, assuming that it is a guessing competition. In that case, say to him, "No, you have not tried them. Take them in your hands and try like this". Then the examiner picks them up and goes through a show of testing the weight by hand, one after the other. As a rule children of five then see what they are meant to do. Others of questionable intelligence lift both the weights in one hand, showing that they have not understood. After one trial the weights are moved about and again given for comparison, but in a different position. This is because some children tend to repeat a choice, and go always for the side on which the first choice has been made. Make no comment till three attempts have been made.

*Scoring.* The test requires two successes out of three attempts for a pass. But if there is any ground for thinking that the success is due to guesswork, it should be repeated to make sure on this point.

This is more advanced than comparing lines of different length. The difference is not that any nice power of discriminating is needed, for there is a marked difference in the weights. It is a test of (I) ability to comprehend the instructions, (b) power to concentrate on the instructions long enough to come to a decision. In short it requires a degree of concentration on a purpose not always found at this age. Temptations to play with the blocks or put one on top of the other must be dropped for the more serious purpose. A deficient child may start well, and then forget the purpose on which he is engaged.

- (2) Naming Colours. Use circles or squares of red, blue, yellow and green, about two inches in diameter, pasted or painted half an inch apart on a sheet of cardboard or white or brown paper. Point with the finger to the colours in the above order, and say, "What colour is this?" Terman says this is not so good as "What is the name of that colour?" but I have found boys understand the shorter form better. The examiner must not name a colour, by saying "Show me the red, etc." as this makes the test much easier than it is meant to be. If a colour has been named wrongly once, the examiner is not to return to it and ask again.

*Scoring.* To pass the child must name all the colours correctly without great hesitation.

This is not a test of the senses, as colour blindness or normal sight is not the point at issue. It is a test of the ability to fit the correct names to colours which are well enough known. The sense impression must be associated with a name which has been learnt. It may seem to some unduly simple, but extended tests have shown that this is too difficult for children of four who can successfully name quite a large number of familiar objects. In fact some have wished to put it in the 6 or 7 year group of tests. It is probably to some extent subject to home environment, as compared with other tests.

- (3) Aesthetic Comparison. A printed form is prepared with three pairs of faces; in each pair, one is coarse and laughable and the other is handsome. Here there is need of a standard, and it is not of much use for a school to prepare home-made drawings. If possible see Binet's standard sheet.

Show the pairs, one at a time. Ask, "Which of these two faces is the nicest". The English "pretty" is not likely to be known, but "khubsurat" and "badsurat" will meet the case well. But do not use both words; either ask which is prettiest or which is ugliest and do not give a choice between the two words. The question is not to be repeated after a response has been given; if it is, the subsequent answer is not to be given credit if correct.



*Scoring.* All three comparisons are to be made correctly, and any marked doubt or hesitation is to be credited as a failure, even if the correct answer is subsequently given.

This is an elementary test of aesthetic or "beauty" judgment, which some have argued is a thing apart from intelligence. But it is a fact established from the tests as a whole that weakness in artistic sense and judgment is as a rule associated with deficient intelligence. Conversely artistic appreciation of an elementary kind may be expected where average intelligence exists.

- (4) Definitions of familiar objects. Use the words chair; cow; spoon; book; pencil; table. Say, "You have seen a chair" Tell me what is a chair?" Go through the list in the above order. (For Binet's horse; fork; doll I have substituted cow; spoon; book.)

Sometimes there is a little hesitation, although it is clear that at this age the subject must know each of the above objects. The test is simply that of framing the idea in simple words and phrases. At this age only an elementary response can be expected; to say for what the object is used. If a little coaxing is needed, say, "Of course you have seen a cow. Now tell me what a cow is." But no more suggestive form of words or hints should be used. Almost any

sensible mention of the use of an object may be accepted. For example, in the case of a pencil, we may accept "To write with," "To draw," or "We write with it." For a table, we will content with "To eat on," "We put dinner on it," "We write on the table" or "It is made of wood and has four legs." But if the pupil points to a table or a chair and says, "There is a table...a chair," this not to be accepted. There are few failures, and they mostly consist of silence.

The words used here have been selected because it is practically certain that the child has heard them used and associated them with certain objects; but there is a difference between knowing and expressing in words, however elementary. It is rather a test of expression and constructive thought than anything else; and normal children of five years have been found advanced enough to define in a simple way at least four out of the six words.

- (5) Assembling a rectangle, sometimes known as "The Game of Patience." Take two rectangular cards, about  $2 \times 3$  inches in length of sides. Divide one of them into two triangles by cutting along one of its diagonals from corner to corner.

Then lay the uncut card on the table before the child, and beside it lay the two triangles beside each other placed with the common sides formed by the diagonal away from each other, so that the relation

to each other is not seen. Then the examiner should



say, "Take these two pieces (touching the two triangles) and put them together so that they look like this." (Pointing to the rectangle.) If there is hesitation or doubt, repeat the instructions with a little encouragement, but say nothing about hurrying up, as this is likely to cause confusion. Give three trials of a minute each, changing the position of the triangles in between times. The reasons for this is that in a single trial, success may be achieved by a lucky move of the pieces, whereas what is wanted is a series of constructive attempts with the aim achieved after trial and error. If the first attempt fails, move the triangles apart again and say, "No, put them together so that they look like this." Say nothing else, either of praise or disapproval.

If one triangle is turned over the task is not then likely to be done, and it is necessary for them to be put back into the original starting position, not counting this as a trial. So the reverse sides of the triangles should be marked, to prevent one being reversed by accident when they are shown to the child.

*Scoring.* Two successful attempts are required out of three. It counts as an attempt when the pupil turns the pieces about and finally hits on some position within the set time.

Of course he may make some moves and give up without hitting on any position, and that too will count as an attempt.

The test requires two factors, (a) To keep before the mind the object in view, i.e. the formation of a rectangle as the idea not to be lost sight of (b) To try different combinations with the object in view (c) To compare the combination of the moment with the model and decide whether it is correct or not. So it is a combination test, since elements have to be formed into a whole but there is continually the one directing idea. It is a test of patience because the pupil has to keep on in a line of action and not be discouraged by one or more unsuccessful efforts.

- (6) Three Commissions. Take the child to the middle of the room. Then say, "I want you to do as I say. Here is a key; I want you to put it on that table. Then shut the door, and after that bring me the box on the shelf there". Point to each object as you mention it. Then repeat, "Do you understand? First put the key on the table, then shut the door, then bring me that box". A slight pause; then say, "Now, do this". Always give the instruction in this order, and do not repeat after the second time; do not even help by looking at the object. If there is any hesitation or doubt after doing one thing, remain

silent and do not help by saying "what next?" or anything else.

*Scoring.* All three commissions must be done, and in the correct order, to secure a pass. To leave out any one or to change the order is to fail.

Success is attained by the pupil who not only understands the orders but also is able to keep them in mind. So it is a memory test, though a different kind of memory from that involved in merely repeating numbers. It tests a kind of intelligence required in most activities of ordinary life.

(Alternative Test.) To give Age. The question is simply "How old are you?" or "What is your age?". The latter is better understood by Indian boys. Of course we do not want to know to the exact month and day, since many boys in India have little idea of their exact age, and the test is open to question in a country where there is no registration of births, and birthdays are little celebrated. Moreover there is a chance that a wrong answer cannot be verified. But most pupils know their age as entered in the school register, and should be able to give this correctly. There may, on the other hand, be an argument for putting this in the 6 or 7 year group in India. Average children have a natural interest in such things about themselves, says Terman, "while the middle-grade imbecile of even 40 years may fail

to remember his age no matter how often he may have heard it stated ”.

#### SIX YEAR GROUP.

- (1) Distinguishing Right from Left. Say to the child, “ Show me your right hand ”. When he has responded to this, say, “ Show me your left ear ”. After that, “ Show me your right eye ”. The words “ left ear ” and “ right eye ” should be stressed and deliberate in pronunciation. If there is only a single error, go through the whole test again, with left hand, right ear, left eye. But do not give any direct indication by looks whether the answers are right or not, that you are pleased or otherwise. Moreover be careful to give no hint by looking at the organs indicated.

*Scoring.* To pass the test, all three questions must be answered correctly, or the three additional questions which are given after only one error must be answered correctly. That is, three correct out of three or five out of six.

In examining, a child may point to first one ear and then to the other. In this, we must assume that the second is the final decision and judge on that alone. So even if the first attempt was right and the second wrong, the answer is considered wholly wrong.

A knowledge of the distinction between left and right comes slowly to children. They seem first to learn up and down, above and below, before and behind, & c. and right and left later on. It may all depend on the frequency with which right and left are heard by the child; perhaps he has been more accustomed to hear "this side" and "that side". But children of much greater ages than 6 years are often quite unable to distinguish between left and right, while children younger than 6 never err in making decisions involving up and down. While this test has been retained in the present age group, there are still some who wish that it had been left to the 7 or even 8 year group.

- (2) Deficient Pictures. There are several standard pictures. The first is that of a face with one eye left out. Show this picture to the child and say, "There is something wrong with this face. It is not all there, for something has been left out. Look and tell me what has been left out". Often a true but irrelevant response is given, such as, "The arms are not there," and so on. In that case, say, "I am talking about the face only. Look and tell me what has been left out". If the correct answer is not given, point to the missing eye and say, "See, there is no eye". Number two picture is the same, but the mouth is

missing. Again we present it but merely ask, "What has been left out from this face?" No more encouragement or pressing is given. In picture number three, the face is minus a nose, and the treatment is the same as with number two. The fourth picture shows a figure of a man complete except for his arms, and again only one question is asked, "What is left out of this picture?" Only with the first question is any help given; the answers should come after that within 25 seconds.

*Scoring.* The pupil passes if he points out the missing feature correctly in three of the four pictures. We may ignore trifling errors such as "eyes" instead of "the eye" in the first picture; or "hands" instead of "arms" in the fourth.

This test is the simplest form of what is known as "completion test" i.e. those in which a missing feature or part has to be detected in what is otherwise complete. The unit to be completed may be a face, a man, a story, a picture, or any object suitable. This test calls for a general perception of form and fitness and a certain association of ideas. The visual image of a face as a whole must be present before an imperfect face can be criticised. The test has been found definitely too difficult for children of five years;



even at six years of age, many fail to criticise a picture showing no ears in a man's head.

- (7) Counting thirteen annas. The method is the same as the counting of four annas (Four year group, No. 3 Test). If the first attempt contains a single error, such as the omission of one number or failure to use the finger properly, another trial may be given.

*Scoring.* The test requires for a pass one success out of two trials. Remember that the pointing must accompany the counting and correspond with it. Again no credit is given for simply naming the correct number without counting; it may be lucky guess.

This test has been thought by some to depend more on progress made in school arithmetic than on natural intelligence. But research and experiment have decided otherwise. Perhaps a child of six might be found who failed to pass from lack of instruction, but as a rule most children of this age have enough interest in numbers to have picked up sufficient knowledge for the test without formal teaching. A failure here is to be looked upon as very significant unless the home environment and previous educational opportunities have been exceptionally bad. Inability to count is a marked feature of many feeble-minded adults. On the whole this is a sound test of natural intelligence.

- (4) Test of comprehension (Second Degree).  
 The questions are: What would you do if:  
 (a) It began to rain as you were walking to school? (b) If you found that your house was burning? (c) If you were going somewhere but missed your train (or bus)?

If a response is not made at once, the question may be made in the wording of it. This is unalterable. There will be a wide variety of answers possible and almost anything showing simple commonsense is acceptable. Thus in (a) we would accept: "Wait under a tree...doorway", "Hire a tonga," "Ask a motor-driver for a ride," or "Run fast to school." But the answer, "Go back home" or "Run back to my house" should fail. Similarly the following answers are good for (b) "Telephone for the fire-brigade... police," "Call for the neighbours to help," "Run for pails of water," and anything suggesting practical steps. But to say, "Go to my uncle's house," "Build a new house," or "Go and tell the policeman" would fail. In (c) the most reasonable answers would be, "Wait for the next train or bus," "Hire a carriage...taxi," or some variations of the same. Such an answer as "Go home again," "Run and try to catch it," "Don't go to that place," or "Go to the next station" would fail. The answer "I would walk" would have to be judged by the distance that had to be walked.

There are three standard questions propounded by Binet and have been tried in many different places. They seem simple enough, but it is amazing to find the great variety of futile and irrelevant answers that are given. Simple as they may appear they are proved tests of intelligence.

- (3) Naming four coins. The coins shown respectively are to be a one, two, four, and eight-anna piece. Show each coin in turn and ask, "What is this?" Possibly the answer may be "Money," in that case ask, "Yes; what do you call this piece of money?" Present them in the order mentioned.

*Scoring.* To pass the test, three of the four must be answered correctly if a wrong answer is given, followed by the correct answer, or vice versa, we ignore the first response, whatever it is, and count the second. No coaxing or urging is allowed apart from the questions indicated.

Some have argued that this is largely dependent on previous experience; and not on native intelligence, since it may be argued that poor pupils from a village seldom have the opportunity of seeing money. In America and England, the results of the tests have not borne this out, since children from poor homes have excelled those from wealthy families. In poor

country districts of India, however, we should be inclined to suspect this test; it will do excellently in all normal schools where a fair home environment can be assumed.

(6) Repeating sentences of 16-18 syllables.  
The sentences are:

- (a) We went for long walk. We saw a white horse in a field.
- (b) I enjoyed myself in the holidays. I went to see a Cinema.
- (c) It was hot this summer. My father bought me a bicycle.

Approach this test as follows: "Listen carefully. I am going to say something, and I want you to say it when I have finished. You must say it exactly as I do." Then read the first sentence clearly and with necessary expression. If the attempt of the child is at all fair, give us expression of satisfaction, "That is quite good." Then go on to (b) and (c), saying before each, "Now, say exactly what I say."

Remember that in this age-group there must be no second reading. In earlier tests, the fact that young children are very shy at times justified a second reading of the first sentence. Now we expect more confidence.

*Scoring.* To pass, the pupil must repeat one sentence absolutely correctly: or two with

only a single error in each. To omit a word, insert another word, or change the order of words counts as an error. The answer given by the pupil should be written down word for word.

There are different degrees of failure. To remember only half of a sentence is naturally more serious than to miss out or put in a word. It would be permissible to use the same sentence for different age groups, setting a different standard for passing for each. For example, at age 7 years, we might insist on two fully correct responses. But there are other tests of the same kind at that age.

(Alternative Test) Forenoon. If it is morning when the test is being held, ask the child, "is it morning or afternoon?" This is so arranged because when confronted with a choice of two things, many children at once choose the latter of the two.

*Scoring.* The test is passed with success if the correct response is given promptly and with confidence. Great uncertainty and obvious guessing and changing of the response would count as a failure.

This test deals with conventional divisions of time, in which many children are found to be backward. Unfortunately as in any choice between two things, there is always the possibility that the correct answer may be given by pure guessing.

## SEVEN YEAR GROUP.

- (1) To give the number of fingers. Ask, "How many fingers have you on this hand?" "How many on the other hand?" "How many on both hands together?" If the child begins to count his fingers one by one, say, "Now do not do that. Tell me without counting," and put question again.

*Scoring.* The test is passed if all three questions are answered without having to count. The question assumes the thumb to be included as a "finger", but a pupil who thought otherwise would be given credit for his effort.

This tests the child's interest in numbers and simple powers of number-memory. It is a good test, and when a child fails in this there is ground for suspecting deficiency. It has been found definitely too difficult for Age 6.

- (2) Description of pictures. The pictures may be used as were prepared for Age 3, Test 3, viz. an Indian home, a post office, a river scene. Here the method of questioning is different because we say "What" is this picture about? What is happening in this picture?" the object being to get some idea of the action or happenings of the

picture, and not merely a list of objects in it. Thus it would not do to say, "Tell me all you see in this picture," for that suggests enumeration of objects. So keep to the formula above. It may be repeated once or twice if there is no response. It stands to reason that the pictures shown must contain some agents and suggest action. The home scene may have a mother cooking over a fire and a child playing with a ball; the river scene may have a man rowing a boat and a boy swimming; the post office may have a man buying stamps and another putting a letter in the box.

*Scoring.* Two out of the three pictures must be successfully explained or interpreted. Sometimes one gets a little enumeration of objects and some description of action; that is fairly satisfactory at this age. But unless the greater part of the response is description of action rather than enumeration of objects, it cannot be considered to pass.

Such answers would be quite satisfactory. "There is a woman cooking dinner on the fire. There is a little boy. He is playing with a ball." or "A fire is burning. There is a dixie on the fire. A woman is making dinner." Again, "There is a woman

beside the fire. There is a little boy. He has a red ball." In the picture of the river scene, "There is a boat. Two men are in the boat. Two boys are in the water and one is sitting." "A boat is on the water. One man is sitting and one is rowing. A boy is swimming." For the post office scene, we might have, "This is the post office. One man is putting a letter in the box. A boy is getting stamps," "A man is speaking to another man. A boy is posting a letter."

When attempts fail, it is mostly because they are only lists of things. For example "There is a fire. There is a boy, This is a ball." and so on. The essence of this test is that more than enumeration of objects is required. Hence it is important that the pictures used should contain suggestions of commonly seen daily acts such as can be described in easy language. If there is little action or detail in a picture, then it will be futile to expect description from children of this age. So they should be drawn up with much thought and care, standardised and kept under lock and key. A little description with a good amount of enumeration of object count failure. Different areas will come to different conclusions as to the value and difficulty of this test unless they use the same set of pictures.

- (3) Repeating five number . Warn the child to listen, say, "I want you to repeat what I say." Use three sets of numbers



3-2-7-5-9: 4-2-3-9-5: 9-8-1-7-6.  
 (Better keep them standardised.) Then  
 read the first set with slow clear voice  
 and regular emphasis.

In an earlier age group, the first test was re-read if a shy child failed to answer. Now it is not so done; and no previous information is given as to the number of digits to be repeated. Be sure the child is attending before reading to him; do not stare at him while he is answering, but keep looking at the papers before you.

*Scoring.* To pass, one of the three readings must be given absolutely correctly.

To repeat numbers is more difficult than to repeat sentences, because there is no thread of thought or meaning to link them together. Thus this is largely a test of pure memory and attention. The most common error is to omit one number or to substitute one number. In extremely weak cases, it is usual for the pupil to remember only the last two or three of the series. Series of five numbers are not all of equal difficulty, and so it is better to keep to the series given and not to make up others. In testing a child for the first time, it is better to begin with a series well below his age group; if he is of 6-7 years of age and likely to repeat five numbers, it is nevertheless better to start him with four.

- (4) **Tying a Bow Knot.** Have prepared a bow knot made with any black or white piece of cord, round a thin staff or pointer. It should be an ordinary double bow; have it ready before the child appears, and do not let him see you tie it.

Place the knot before the pupil so that the wings are to right and left of him. Say, "You see this? It is a bow-knot. Now take this other piece of string and make another bow-knot round my finger." You then give the child a piece of string and extend your finger to him in a convenient position. This has been found to be better than asking him to tie a knot on a stick or another round object; yet some examiners have preferred the latter method. Some say that they cannot do it and are unwilling to try; however many such succeed after an effort, so all should be persuaded to try.

*Scoring* The test requires for a pass that a double bow-knot with both ends folded in should be made in one minute. If only one end is folded, i. e. if it is a single bow-knot, the pupil counts  $\frac{1}{2}$  pass. The preliminary plain knot which forms the basis of the bow-knot must not be left out, and the finished knot should be reasonably firm and not loose.

This test is of motor or nerve-muscle co-ordination, and may appear to some to test other qualities

than intelligence. But it has been found to be a good indication, inasmuch as mentally deficient pupils almost always fail, whereas bright children quickly learn to do it. There is the other criticism that previous training would give a great advantage here. This is true, and in a school with a troop of boy-scouts, it is likely that all will have been trained by the scoutmaster in tying knots, and that the pupil who is not a scout will be to that extent handicapped. In such a case, alternative tests should be used.

- (5) To give differences between objects. The first question is "what is the difference between a fly and a butterfly?" If no answer is given, as will be likely at first, say, "you know what a fly is? You have seen a fly? And you have seen a butterfly? Tell me the difference between fly and a butterfly." Then in the same way with: stone and egg; wood and glass. A little repetition is sometimes necessary, but any alteration of the form in the question is forbidden. The examiner must, for example, never say, "Which is larger?" for that is practically supplying a response. The difference, whatever it is, must not be suggested by such a question.

*Scoring.* It is a pass if real difference is named in two out of the three pairs. It need not necessarily be the basic or most important

difference that exists, but must be a real one.

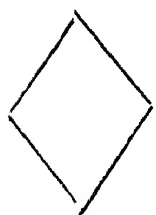
For example, "A butterfly is larger than a fly," "A butterfly has nice colours and a fly has not," "A fly troubles you and a butterfly dose not" "The butterfly gets honey from flowers but the fly does not," are all correct and true differences. Similarly to say, "Stone is harder" "The egg breaks easily and the stone dosen't," "The egg is for eating but you can not eat a stone," "The stone is heavier," are all reasonable. Also, "A stone will not break but an egg will," though not strictly correct, may be accepted as showing sufficient sense of difference. But such as "A stone is bigger," or "A stone is not round like an egg," have not sensed essential differences and can be counted as pases. We would accept, "Glass breaks and wood is tough," "You can see through glass but not through wood," "Wood will burn but glass will not," "Glass is made by men but wood grows." But "Glass is better than wood," or "Glass is not thick like wood," are failures.

This is a test of thoughtfulness and the critical faculty. It calls on the elementary powers of the association of ideas such as are involved in simple judgements. The power of noting differences is expected in a child at a slightly earlier stage than the power to see resemblances. Moreover the objects to be compared are not present at the test, so the child is thrown on his own stored impressions of memory

for the comparison. Weakness in the formation and presentations of ideas well lead to failure in this test. The ideas will be elementary; things apparent to the casual eye. One would not expect from a child the remark that the egg belongs to the organic or animal kingdom while stone is inorganic or mineral.

There is always in certain children a tendency to repeat an answer that as once passed muster. The child who has said "A butterfly is bigger than a fly," and found it accepted will probably try "A stone" larger than the egg," or "Wood is larger than glass. If this mechanical tendency is observed, the whole test should be marked as a failure, even though the stock answer happened to fit one of the questions.

This would be a more difficult test with different pairs of objects, eg. stone and iron; wood and grass. So do not vary the objects laid down for this age.



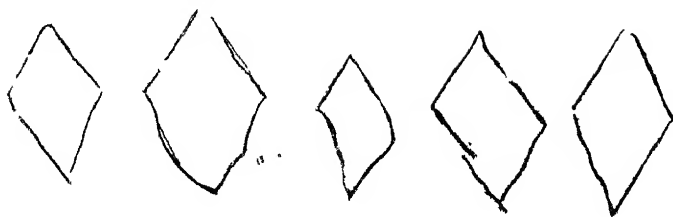
- (6) To copy a diamond. On white paper or card-board prepare a diamond with diagonals about 3 and  $1\frac{1}{2}$  inches. Place this on the table with the longer diagonal pointing towards the pupil, after having given him pen, ink and paper. Say "I want you to draw one just like this." Give three attempts, saying each time, "Make it just like this one." Only point to the figure and do not run finger round it.

Children of seven years usually have enough confidence to make the effort to draw without coaxing. The examiner should study whether the child tries to draw in some detail, keeping attention on the model for each line drawn, or whether he tries to draw the whole figure at one effort after a brief look at the original. After each effort, ask the child, "Is this a good one?" and when all three are completed, "Which is the best one?" Deficient children will be found to express themselves satisfied with very irregular and shapeless efforts, but a child with any perception at all will usually pick out the best of three.

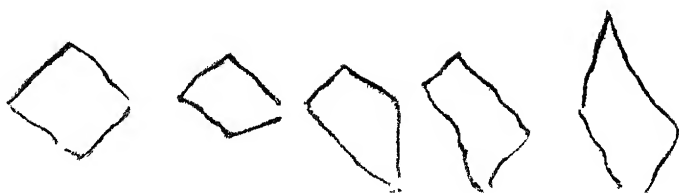
*Scoring.* The test is passed if two of the three have some rough resemblance to the model. The size will probably be smaller than the model in most cases, but this point may be disregarded. It should, however, be drawn in the correct position i.e. with the diagonals in the same position as in the model.

The examiner will note the formation of angles, the equality in length of the sides, and the relation of sides and angles to each other. There must be four clearly defined sides and four angles; there should be evidence that the child has noted that two angles are obtuse and two acute. The figure should not be a square nor a kite, i.e. a diamond with two short and two long sides. For example:

the following will pass:



but these are failures:



(Alternative Test.) Naming the days of the week. Say to the pupil: "Do you know all the days of the week by name? Tell me all the days of the week." If the answer shows that there has not been proper understanding, or if there is no answer, the question may be repeated without change. No further question or pressing should be given, and as the child answers, the examiner's face should give no sign to indicate whether the response is right or wrong.

If the pupil names the days in their proper order then there is required a further test to see whether he has fully understood what he has said, as sometimes there is a mechanical repetition of the names which is not founded on understanding. So ask next, "What day comes before Wednesday?" "What

day comes after Friday ? ” “ What day comes after Thursday ? ”.

*Scoring.* To pass, the pupil must within fifteen seconds name all the days in correct order, ( though it does not matter with which day he begins ) and must then answer correctly two of three test questions.

The test as originally used suffered from the fact that it often was answered correctly from memorised words not properly understood, but the addition of the supplementary questions has corrected that tendency. It is possibly a little subject to age, as apart from intelligence, as compared with other tests.

( Alternative Test 2 ). To repeat three numbers backwards. The numbers used as standards are :— 2-8-3 ; 4-2-7 ; 5-9-6. If used, this test should not come before number three of this age group, that is repeating digits in the order as heard. Say, “ Attend carefully. I am going to read you some more numbers, and this time you have to say them backwards. For example, if I say 1-2-3, then you must say 3-2-1 ”. When the child has grasped this, say, “ Now be ready, and be sure to say this backwrrds. 2-8-3 ”. Read at a quiet even rate, and only once. There must be no second reading at any time in this test. If, however, the child should repeat the numbers forward instead of backwards, showing that the instructions have not been properly understood, then they may be



repeated with a warning that the reading must be backwards.

*Scoring.* To pass, one of the three readings must be absolutely correct.

This is a more searching test of intelligence than the repetition of numbers in the same order as spoken. It calls for more attention and increased concentration. Memory must hold the numbers while other factors of the mind deal with reversing them. Definitely deficient children find this a sad stumbling-block, and cannot easily adjust themselves to the novelty of the task. As a rule this takes up more time than other types of test. It leads to success if the pupil thinks over the adjustment for a while and does not rush his effort. Those who fail either give the latter part of their response in the forward order, or else forget and fill in with any numbers.

#### EIGHT YEAR GROUP.

- (1) The Bell and Field Test. Draw a circle with a little break in the circumference, to represent the entrance to a round field (The circle may be about  $2\frac{1}{2}$  inches across.) Say, "A cricket ball has been lost in this round field. You do not know in what part of the field it is, but only that it is somewhere in the field. Take this pencil and mark out a path to show how you would search for the ball, making sure

that you had looked in every part of the field. Begin at the gate here, and show me where you would go". On no account say, "Show me how you would walk around in the field," because that would give a clue to the correct solution, namely a circular path.

The child may point and say where he would go, then you must say, "No, take the pencil and mark the path on which you would go". Some make a path for a little, and say, "Now I have found it". You must then say, "No, you have not found it. Go on with your path. Where will you go next?".

Four different classes of efforts will be found here.

- (1) The child either does nothing, or draws at random with the pencil a few strokes that could not be said to make up a search. This is a failure.
- (2) The child draws, evidently carrying out a search, but without any idea of a plan. His path crosses and re-crosses, going several times over the same place while other parts of the field may be unsearched. The path is broken and the pencil set down in a different part of the field. The field may ultimately be filled up with random wanderings.

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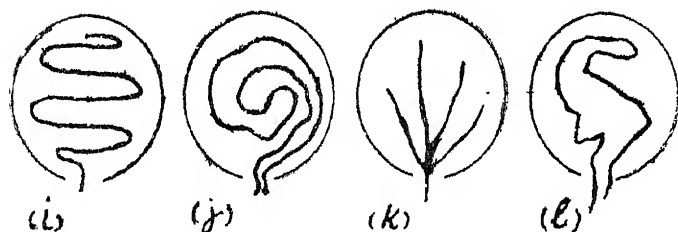
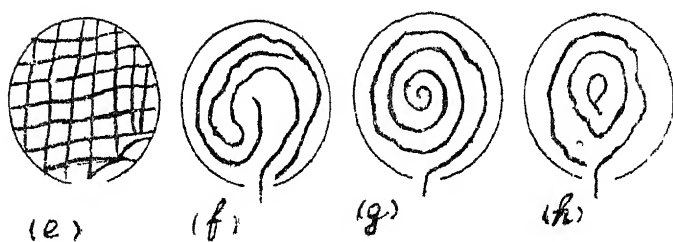
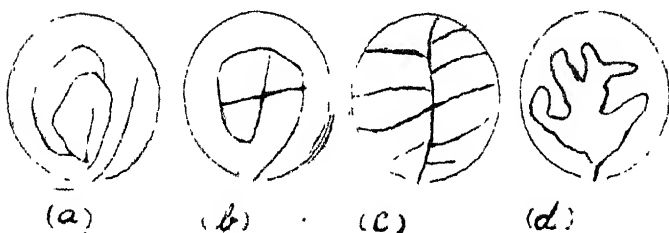
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- (3) There may be evidence of a plan, though it may not be a very methodical one. There will be fewer crossings and perhaps a number of parallel lines, showing that the idea of systematic quartering of the ground is there, and there will be fewer breaks in the path than in Class (2). Many different varieties of this imperfect plan may be found. There may be a number of lines going out from the centre of the field like the spokes of a wheel; there may be a number of lines going from the gate to different parts of the field. There may be lines going back and forward across the field, curved or angled at the ends, not always intended to be parallel. There may be a single line roughly a diameter of the field, with a number of lines branching off at intervals like the ribs or veins from the centre of a leaf. There may be a system of horizontal and perpendicular lines which divide the field up like a draughts board. There may be combinations of several of the above. If the examiner is satisfied that there is an effort at a plan and that a scheme of some kind has been shown, as opposed to random methods, he may pass an 8 year old pupil on such an effort.

- (4) The ideal method is taken to be a spiral course, starting in the middle field and walking round and round, or a number of concentric circles, through transverse lines which are parallel and joined at the ends will pass if truly and methodically shown.



(a) No plan shown; is a failure. (b) Also failure. (c) The "lefa pattern" "may be passed for age 8 but not for 12. (d) Too Wandering; no coherent plan. (e) The grid pattern; a plan, though a poor one. Pass at age 8 but failure at age 12. (f) A plan, though broken. Pass at age 8 but not at 12 (g) The best possible solution; pass at any age. (h) Not so good as (g) but pass for or 12 years. (i) A good plan; pass at either 8 or 12 years. (j) Lacks the system of (g) but may be passed for 8 or 12 years. (k) The "radii" pattern; pass at 8 years but failure for 12. (l) Irregular and unplanned; fail at any age.

This test is not so easy to standardise in scoring, as many varieties of plans are possible. By seven years, the first growth of planning ability is evident, but only at eight years do we get such efforts as (c), (f) and (k). But the efficient planning of efforts (g), (h) and (i) only emerges at 12 years. The examiner will be puzzled by number of doubtful responses, but experience will enable him to judge. This is a test of judgement and show how the child is beginning to apply himself to a practical problem. It is valuable among so many tests which are purely abstract and mental in nature, and it is more interesting than many.

- (2) Counting backwards from 20-1. The examiner says, "Can you count backwards? I want you to count backwards from 20 to 1. Begin!" Mostly this is all that is required and an instant start is made. If he does

not understand and remains silent, or counts forward, say, "Begin counting backwards from 20 - 1, like this; 20 - 19 - 18 ... so on down to 1. Now begin." Insist on an effort though the pupil may say that he cannot do it, as when a start is once made it seems to become easier than it was in anticipation. Do not say "Hurry up!" as some are upset by this; in fact say nothing at all when once he has set off.

*Scoring.* To pass, the child must count from 20 to 1 within 40 seconds, with no more than one error. If the child corrects his own error of his own accord, that is given full credit.

The test would be easy enough if there were unlimited time, but it is the 40 second limit which sets the standard for this age group. As a rule, the average child of eight will do the task well within the time limit. Something more than mere memory is required here for there must also be an apprehension of the relations of the numbers to each other in an unusual order. Concentration of attention is involved and to lose sight of the "backward" instruction for a moment means the mind will start to count in the more familiar forward direction.

- (3) Test of Comprehension (Higher Degree).  
What should you do (a). When you have broken something belonging to another

person? (b) When you are on your way to school and see that you are going to be late? (c) If a companion hits you by accident?

The method is the same as in the Four and the Six year age-groups. If the pupil hesitates and does not answer, the question may be repeated up to a second repetition, but the wording must not be altered, whether to simplify or expand it. No other remark or coaxing or hint may be given.

*Scoring.* Two out of the three questions must be answered reasonably. Remember that three will probably be a wide variety of answers; simplicity and common-sense are the qualities required.

In (a) we might accept any of the following: "Tell him I was sorry," "Tell him I could not help it," "Offer to pay for it," "Help him to mend it," Etc. The following would fail, "Keep quiet and say nothing," "Go and hide it," "Tell him it was not my blame."

In (b) the following would pass: "Run as fast as I could," "Take a tonga," "Ask someone in a motor car to give me a ride, or "Walk faster." The answers, "Do nothing," "Tell the teacher I could not help it," or "Go home again" would be classed as failures.

In (c) we would accept, "Ask him why," "Ask him if he was sorry," "Tell him to be careful," and the like. We would not pass, "Go and tell teacher," "Tell my father," "Throw a stone at him," or any thing obviously not in accord with right thinking however simple.

- (4) Given similar points in two things. Say to the pupil, "I am going to name two things, and I want you to tell me some way in which they are alike. An apple and mango in what way are they alike?" Then ask the same question regarding wood and coal; iron and silver; a ship and a motor-car.

After the first question, the others may be asked in the wording "In what way are iron and silver alike" If the child does not answer, press a little and repeat the question; say "I am sure you know if you think," but do not give any simplified or different wording of the question, or hint of any description. Do not ask, "What is iron used for?" or "What is the use of silver?" but repeat the basic words without change. It is just permissible to say, "I think you know how an apple and a mango are alike?"

Sometimes children will give points of difference and not of similarity, as "A mango has a stone and an apple has none." In that case, say, "That is true, but I want you to tell me something in which they are alike." It is difficult at times to get deficient

children away from noting differences and into the proper channel.

*Scoring.* To pass, the child must give a reasonable point of similarity in two out of the four tests. Any real likeness may be accepted, although it may not be the essential or most important one. For example:

“The apple and the mango both are round,”  
 “They are the same colour,” Both are good for eating,” “Both grow on a tree,” Both are fruits,”  
 “Both are green in colour” may all be accepted. But  
 “Both taste the same,” “Both have a lot of seeds,”  
 “An apple is smaller than a mango,” and so on, are failures. More than half of the failures will be those which give differences instead of likenesses.

Similarly “Both wood and coal will burn,”  
 “Both are used to make a fire for cooking,” “Both of them are heavy...hard” “Both come out of the ground” or both cost a lot of money” may all be accepted, but “Both are black,” “Both are dirty” or  
 “Both are hard to break” Wood is not so heavy as coal” cannot pass.

In the case of iron and silver, such as “Both are metals,” “Both come out of the ground ..out of mines” “Both are heavy,” “Both are used for making different things” or “Both can be polished” may all be passed, but such as “Both are thick,” “Both



will rust in the air," "They are the same colour" or "You cannot eat them" are clearly failures.

In the case of a ship and a motor-car, the following all express reasonable differences, "Both help you to travel...to go on a journey," "Both go fast" "Both have to be guided by a man" "Both may have an accident, if you are not careful," or "Both have engines." But if we get such answers as, "Both are very big," "Both make a noise," "One goes on the sea and the other on the land," or "A motor-car can go faster than a ship," then it is obvious that they cannot be passed.

Experiment has shown that to give similarities or resemblances is as good a test of intelligence as to give differences. It is definitely too difficult for the seven year group, and those clearly deficient give a variety of poor and unsatisfactory answers. The great source of failure is the giving of differences instead of similarities.

- (5) Giving definitions more advanced than stating for what objects are used. The opening question, without any preliminary explanation is simply "What is a balloon?" If it appears any of the words happen to be unknown to the child, substitute from the following: boat; chair; potato; shop.

Do not say anything about the answers as they are given, but go through the list of four i. e. balloon; tiger; football; soldier. In case of silence or hesitation, the question may be repeated in an encouraging tone, but without altering the wording in any way. Usually an answer of some kind will be obtained.

*Scoring.* The Test is passed if two out of four are defined in a manner better than merely stating for what the object is used. That is there may be some description or account of the nature of the object, its form, colour, appearance, and so on. Or they may say something about the class of object to which a particular object belongs, and state its place in that class. Futile answers such as "A football is for playing football" or "A soldier is a man" can naturally be given no credit. But a simple description of the essential features or functions is often enough obtained: eg. "A football is a large ball as big as your head. We kick it into the goal," or "A motor-car has an engine. It can go at fifty miles an hour," or "A soldier wears a uniform and has a gun. He fights in battles," are sound answers. Here are some stock answers:

*Passing.* "A balloon is a means of travelling through

the air." "A balloon is an airship made of cloth and filled with gas" " "A balloon is filled with gas and carries people in a basket underneath." "A balloon is a big bag with air in it for going up."

*Failing.* "To go up in the air." "What you go up in." "Men go up in it." "It is filled with gas."

#### FOR THE TIGER:

*Passing.* "The tiger is a wild animal of the cat family." "The tiger is a savage animal like a big cat and lives in the jungle." "The tiger lives in the jungle and sometimes kills men." "The tiger lives in the jungle but some are in the zoo."

*Failing.* "Something that eats you." "It travels in a circus." "What eats people." "A tiger is a beast."

#### FOR A FOOTBALL:

*Passing.* "It is a ball made of leather and filled with air. It is made for kicking." "It is a ball you kick when you are playing." "It is made of leather and filled with air." "It is made for kicking and is blown up with a pump."

*Failing.* "To kick." "To play with." "What boys play with." "It is filled with air."

FOR THE SOLDIER:

*Passing.* "A man goes to fight when there is war."  
"A man who is very brave." "A man who wears a uniform and has a gun." "He is a man who marches and does drill."

*Failing.* "To shoot." "To fight." "Who goes to war." "A man that marches." "He fights."

Most children will say something or other, and a study of the above, aided by the perception that comes with a little experience will enable the examiner to decide what is a fair definition of essentials. The main point is that there must be some description, and that merely to mention the purpose for which it is used is not sufficient at this age.

- (6) Vocabulary. Twenty definitions. There is a little booklet commonly used for the purpose with a list of 3600 common words. If this is not available, an old dictionary may be kept with a selection of from one to two thousand fairly common words underlined, from which selection may be made for this purpose. But it is better, having underlined them, to prepare them in a list

in order of difficulty, so that in the test the fairly easy words come first. The earliest in the list should be such as children of eight years may reasonably be expected to know; those of ten years old may be asked to start at a later point in the list, and those of twelve later still. A list may soon be drawn up with the help of one or two teachers of the language of the pupils to co-operate.

The method of questioning is as follows: "What is a mango?" "What is a cloud?" "Sing; what does sing mean?" "Hunt; what does hunt mean?" "What is a leaf?"

A certain amount of hesitation may be expected from pupils who expect that a full and comprehensive definition is required. Then a little coaxing is justified, as, "Come on now, you have seen a cloud. You know what it is. Just tell me." If there is still hesitation, say, "Tell me in your own words. I don't care how you say it. I just want to find whether you know what it is." But if there is still no answer, go on to the next word, and if you think that the pupil's confidence is restored, have another try at the troublesome word later on. But do not give any other help than that indicated; do not on any account illustrate by using the word in a sentence. If the definition given leaves some doubt as to whether the

pupil really understands the meaning, say, "Explain this," or "I don't understand what you mean." Encourage him by saying, "Good!" now and then, or "You are doing well." Never tell the child that the meaning he has given is wrong, and never ask him to give another definition. Avoid giving any model form of answer, and try to record all his answers word for word.

*Scoring.* Credit is given for a correct answer if any correct meaning is given for a word, though it may not be the most general and widely used sense. Sometimes  $\frac{1}{2}$  credit may be given, but this should not be made a regular practice, but retained for really doubtful answers.

A fair way of ascertaining the child's entire vocabulary is to take the number of words out of a selected 100 which appear to be known, and multiply that figure by 180. A child defining 20 words fairly well may be assumed to have a vocabulary of  $20 \times 180$  or 3600. At ten years old, the child defining 30 words is assessed as having a vocabulary of 5400; at twelve years the pupil who defines 40 words has a vocabulary of 7200; at fourteen years the boy with correct definitions for 50 words is credited with 9000.

The forms of definition given may vary much in merit, this is not considered in scoring. A poor definition is accepted if it shows that the child has an idea

of the meaning of the words. If there is real difficulty in deciding whether a definition can be accepted, another word had better be substituted. Here are some definitions, not very high in quality, but acceptable:

- (1) A mango. "It grows on a tree." "It is nice to eat." "It is green and has a stone in it."
- (2) A cloud. "It is mist in the sky." "It is like smoke." "It comes before rain." but not, "It is white," or "It is black."
- (3) Sing. "To make a song with the voice." "The birds can sing." "It is nicer than calling." "It is music."
- (4) Hunt. "To go to shoot something." "To chase a rabbit." "To go for sport." "To look for a lost ball."
- (5) Leaf. "It grows on a tree." "It is a page of a book." "It is green and it grows." "It is made of paper." "There is writing on it."
- (6) Health. "It means good health or bad health." "It means being strong." "It is not being sick."

From the above it will be seen that sometimes the repetition of the word may be necessary in the defini-

on, and that a very limited expression may earn a pass. One cannot expect an elaborate definition at his age.

The only experience gained in this test in India has been complicated by the fact that English was a foreign language to the pupils concerned; hence the words selected had to be much simpler than those given to American or English pupils. Such words were given as axe; burn; bus; sing; test; foolish; hout; report; feather; preparation; delay; procession; office; shame; hurt; healthy; single final. It was, though some doubted the wisdom, agreed that if a boy promptly showed his knowledge of the meaning by giving the Urdu equivalent of a word, full credit should be given. The ideal to aim at is that the whole test should be in the boy's vernacular.

This test is based on the belief that a good selection of 100 words will provide a fair test of a boy's vocabulary. Research has justified this. An approximate idea of the subject's vocabulary is gained, for the proportion known in 100 seems to hold good throughout. This is one of the most valuable of all tests, and in itself does more than any other test to show the index of intelligence. That is, it must be reiterated, true only when the test is in the mother tongue of the pupil, and the same reliability can not be claimed for it if applied in English to Indian children. There is no method as yet of considering the



quality of the definitions in scoring. Many definitions are bound to be incorrect and vague, and many are more or less guess-work. Much is gained by observing the results,

(Alternative Test.) Naming six coins. One pie, one anna piece, two anna, four anna, eight anna pieces, and one rupee.

*Scoring.* All of the six must be named correctly. If the pupil, however, changes a wrong reply to the right one of his own accord, he is to be given full credit for correctness.

(Alternative Test 2) Writing from Dictation. Give the child pen, ink and paper, and when he is ready, say, "I want you to write something for me. Do it as well as you can. Write the words, 'See the little boy.' Don't forget it, 'See the little boy.'"

Do not dictate it word by word; it must be all at once. Do not repeat again after saying it as directed, for it is a test of memory among other things.

*Scoring.* To pass the test, the subject must write it legibly enough for it to be easily read, and no words should be missed out or changed. Trifling mistakes in spelling are not to cause failure, as long as they are trifling and not complete travesties of the words in question. If the spelling is such that

one not knowing the original dictation has to puzzle as to what word is meant, then that would be a failure. Similarly ordinary poor writing would not mean a failure if it were only ordinary poor writing of the standard of eight-year-old pupils. But sprawling irregular writing suggesting four or five-year-olds would be a failure.

Several experts in the science of educational tests have rejected this particular test on the ground that it is more a test of handwriting and spelling than of intelligence, and also the fact that an intelligent child who had not been fortunate enough to receive sufficient school instruction would be likely to fail in it. At the same time, if a child fails to pass this test and there is no evidence of lack of school instruction, his intelligence would be suspected very much indeed. Hence it is a good test in cases where there is suspicion from other sources of actual deficiency; in normal cases it is to be regarded as a test with strict limitations.

#### NINE YEAR GROUP.

- (1) Giving the Date. The following questions are put, the order never being varied: "What day is this? I mean, what is the name of this day in the week?" "What month is this?" "What day of the month

is it?" "What year is this?"

Sometime the pupil will not understand fully, and will answer, "The 8th," when asked the day of the week, or "Monday" when asked the day of the month. If this is so, the question may be repeated with suitable emphasis, but the wording must not be simplified or altered in anyway.

*Scoring.* The third question, that dealing with the day of the month, may be viewed with latitude, and error up to three days allowed. After all even adults are frequently in doubt and have to consult a calendar. But the other three must be answered without error.

Practically all children will be found to have learned time divisions by this age. In some schools, calendars are kept in the class-room, and certain pupils in turn keep them up to date from day to day. Most schools make it a practice that all written work, home or in school, should be dated. So there is not much possibility of a pupil having had no chance to become familiar with the various points. Of course there will be some days that are more easy to remember than others. Every boy knows when it is Friday because of the Saturday holiday to which he is looking forward. Similarly Monday is unmistakeable as coming on the top of the week-end break.

- (2) Arranging Five Weights. Use for the five weights 3, 6, 9, 12, and 15 grams, or in countries where that system is not used, 1, 2, 3, 4, and 5 ounces. Remember that the weights must be similar in size and in appearance (as before made of pill or other card-board boxes of equal sizes), the difference in weight being arranged by the filling of lead shot and cotton wool.

Place the five weights in confused order before the pupil under test, and say, "Do you see these boxes? They all seem the same, but they are not the same. Some are heavy, some are not quite so heavy, and some are lighter still. I want you to find the heaviest one and place it here. Then find the one that is just a little lighter and place it next. Then the next lighter one here, and the lightest one of all at this end. Do you understand?" Whether the pupil expresses understanding or not, say next, "Remember that all the weights are different. Find the heaviest one and put it here, the next heaviest here, and so on till the very lightest is at this end. Now begin!"

It is well to keep to that formula, which is as simple as need be for this age-group. If there is still hesitation, the same instructions may be repeated, but not expended or changed in any way. Do not suggest lifting the blocks in the hand, one after

another to try them, and do not go through the performance of doing so as that will be the same as suggesting it. It is part of the test that the pupil should think out his own way.

Three trials are allowed, the blocks or boxes being mixed up again after each attempt. Do not repeat the instructions for the second or third trial, unless the first effort shows obvious misunderstanding of what is required.

*Scoring.* The requirement is that the boxes be arranged in the correct order in two out of three trials. Even one error in any trial makes that a failure. To speed up the test, the boxes may be marked with their respective weights on the bottom, but obviously this marking must be understandable by the examiner only and not by the pupil.

Experiments have been made in varying this test. For example, 3, 9, 18, 27, 36, and 45 grams would make it definitely more easy. If only one success is required in the three trials it might be applied to children a year younger in scale; if three successes are demanded, it might be made a year older. It is essential that the pupil finds his own method, though some have suggested that it is better to set the example by weighing the blocks by movement of the hand, to give the pupil this suggestion of method. Some child-

ren try two blocks, one in each hand at the same time. But that does not seem to give as good results as successive trials of the different blocks with the same hand. The ideal method is to try them all, make a tentative placing, and then check it by going over the blocks again. Only children of distinctly good intelligence make a practice of giving this final check. Observe the method, whatever it is, for it is likely to be very instructive.

This test brings out the pupil's intelligence in manipulating objects, as opposed to abstract thought. It tests his ability to act rather than to speak or describe. Much light is shown on his powers of practical judgement, which have much to do with efficiency in ordinary life. It is more interesting for the pupil than are most tests.

- (3). Giving change for money. The following questions are put in succession: "If I buy three annas worth of sweets and give the shop-keeper an eight-anna piece, how much money should I get back?" "If I buy seven annas worth and pay with one rupee, how much should I get back?" "If I buy twelve annas worth and pay with a five-rupee note, how much change do I get back?"

Actual coins are not used, and no calculation may

be made in writing or figures on paper, slate, etc. If the pupil forgets the problem, it may be repeated once more only. The answer to each question must come within a limit of fifteen seconds.

*Scoring.* To pass the test, two of the three problems must be answered correctly within the time. If a wrong answer is given, but spontaneously corrected, the second answer is given credit.

This is more than, as seems on the surface, a question of simple subtraction. Some backward children, who could quite well do the subtraction part of the calculation, do not realise that that is the required operation, and either add or do nothing at

1. So the selection of the method is for many the stumbling block. It is the practical application of well-known method, even of the simplest type, that confuses the feeble-minded, for they sometimes lack the reasoning power which should instruct them the sum of the purchase must be subtracted from the sum given to the shop-keeper. Some have tried the use of actual coins in this test, thereby making it an entirely practical operation, and claim that it is a better test; but in our present age-group a majority have agreed on the value of the test as stated here.

- (4) To repeat four numbers backwards. Three sets have been standardised in the Revi-

sion: 6-5-2-8-; 4-9-3-7 and 3-6-2-9.

The method of application and of scoring is exactly the same as in the Alternative Test of the Seven years group.

- 5 To use three words in a sentence. The following sets of three may be standardised:  
boy, garden, ball; cow, milk, b u t t e r ;  
bicycle, road, stone.

The examiner will say, "You understand what a sentence is? It is a number of words which say something properly, which make sense. Now I am going to give you three words, and you must make a sentence which has these three words in it. The three words are 'boy' 'garden,' 'ball.' Now make a sentence which has all these three words in it." He will not show the pupil the three words in writing, for the test is purely oral.

Should the pupil appear not to understand, the instructions may be repeated as before, but on no account is the examiner to illustrate by making up a sentence for him. Sometimes a pupil seems to think that a sentence is to be made by some arrangement of the three words, without others. If this is the case, say, "There must be other words put along with these three in order to make a sentence."

If a sentence is not forthcoming within one minute, then that part of the test is considered a



failure and the next group is brought on. But do not on any account urge the pupil to hurry, or mention the time limit to him, as to do so generally leads to confusion.

*Scoring.* To pass the test, satisfactory sentences must be given for two of the three groups. A sentence should be a simple sentence; if a compound sentence, it should not consist of two distinct or unrelated ideas. It must be moderately sensible. For example: "The boy plays in the garden with his ball," "The boy plays with his ball in the garden," "A boy came into our garden for his ball," "I gave my ball to a boy in the garden," "A boy is in the garden and he is playing with a ball" are all passes. But "A boy is in the garden. I have a new ball" is not a pass. Of course a relative clause will be quite admissible, eg. "A boy who had a ball came into the garden."

Similarly the following are good: "The cow gives us milk and butter." "The cow gives us milk and it (which) is made into butter." "We have a cow and from it we get milk and butter." "Milk and butter come from the cow." But we would not accept, "The cow is an animal. It gives milk. Milk gives butter."

The examiner would accept, "My bicycle struck a stone on the road," "My bicycle was going on the road and it hit a stone." "On the road, a bicycle may be spoiled by a stone." But not, "I have a bicycle. There is a good road. I hit a stone on it."

This has been found on the whole a good test of intelligence and the power to associate ideas. There will be wide differences in quality between the answers by the bright and the dull pupils, but some experience will show what may be accepted as satisfactory. As a rule, the bright children will have sentences which have logical connection and sense, and seem to arise naturally from the suggestion of the words. The dull child will often prefer a compound sentence which is grammatically correct and satisfies the requirements, but shows a tendency for the ideas to separate rather than to combine in logical connection. Ability to combine separate elements into a compact whole is one of the essential features of intelligence. The child must take the bricks, in the form of the given words, and supply the cement and labour to build up the complete sentence. To a certain extent, inventiveness is called for. Therefore children scanty in ideas and only imitative in power respond badly to this test. Some have followed Binet himself in wishing to make it a test for the 10 years group; the majority prefer the present test. But a different set of words would supply quite a different standard of difficulty.

- (5) To name the months. This is an alternative test in the Binet-Simon revision, but is here substituted for that of finding rhymes, which obviously will only be suitable for English-speaking pupils, or those very advanced in English.

So the test is simply to ask the pupil to name all the months of the year, in whatever calendar is currently used in the area. Do not start by naming one month and asking the boy to continue, but give no suggestion whatever. After he has responded, ask certain supplementary questions, such as, "What month comes before May?" "What month comes after October?" and so on, three such questions to be asked.

*Socring.* The test is passed if the months are correctly named within 20 seconds, though one error may be condoned (either of failing to give the name of one month, changing the order, or giving one month twice) This is subject to further condition, that two of the three supplementary questions must be answered correctly. It does not matter with which month the pupil begins, provided he carries on correctly from it.

Some criticism has been made that this test depends on an accident of training; that a pupil may or

may not have been taught the names of the months in school. That hardly seems justified, though there is no doubt that increasing age makes the defective child more and more familiar with the months. The check question are to assure that the answer is not merely memorised repetition of a list of names, but that there is true understanding. (Alternative Test.) To total the value of stamps. Give the pupil a piece of cardboard on which have been pasted three one anna and three two-anna stamps, arranged thus: 111222. Say, "You know how much a stamp like this costs? (Touching a one-anna stamp) And you know how much like this costs? (Touching a two-anna stamp) Now how much money would it take to buy all these stamps?"

Do not tell the boy the values of the stamps if he does not know them, for it is part of the test to find out whether a pupil has had enough natural curiosity and observation to find out and remember such things. If the values are known but the first total cost given is wrong, then a second attempt may be allowed. It is necessary for the examiner to guard against mere guessing, if more than one effort is allowed.

This test shows the child's interest in common objects, like the naming of coins, months, days of the week etc. It is usually the apathetic defective child, with no particular interest in anything, who fails to notice all such things. At the same time, this test which has been found successful for the children of

America, England and France, may not be entirely suitable for country districts and villages of India, where to see a letter written and posted is not an everyday event.

#### TEN YEAR GROUP

- (1) Vocabulary. To give definitions of thirty words. This is the same as Test 6 of the Eight-Year group, except that the requirement now is thirty words. Almost any definition that shows that a meaning is known may be accepted.
- (2) Recognising absurdities of statement. There are several standardised sentences:
  - (a) A boy said, "The road from my house is downhill all the way when coming to school, and downhill all the way when going home again."
  - (b) "The engine driver said that the more carriages there are on a train, the faster it will go."
  - (c) "There was an accident to a railway train yesterday but it was not serious. Forty five people were killed."
  - (d) "A man fell from a high house in the city and was killed. They took him to the hospital, but they do not think he will get better."
  - (e) "The blind man saw me drop a rupee on the road, and helped me to find it."

Each sentence should be put in the following terms: "I am going to read a sentence which has something foolish in it, something that is wrong. Listen carefully and tell me what is foolish in it." Then read the sentence slowly and in a normal voice, saying after the reading, "What is foolish about that?"

An answer should come within thirty seconds. If there is no answer, the sentence may be repeated, but no kind of question or hint may be given; only the same formula as before. Such questions as "How could the road be downhill both ways?" or, "How could a man get better if he was dead?" must on no account be put. This would be answering the question for the boy. Do not laugh as if at the absurdity when reading the sentences.

It may be difficult to judge from a pupil's answer whether the absurdity has been fully appreciated. In such a case say, "I am not sure what you meant. Explain to me why this is foolish." By such means try for a fuller reply which will show whether the point has been grasped.

*Scoring.* The test is passed if the absurd point is understood in four out of five sentences.

Here are some examples of answers:

- (a) The downhill road. "If it was downhill coming to school, it would have to be uphill

going back." "It can't be downhill both ways." "That could not be (Explain what you mean) Because it must be uphill one way or the other." "That is impossible (Why is it impossible?) Because no road can be downhill both ways." All these would be passed.

The following, would fail. "Perhaps he took a different road when going home." There must be many bends on the road." "The man lives down in a valley." "The road goes round a hill."

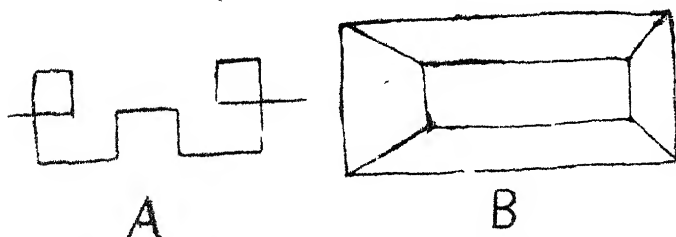
The Engine-driver's remark. "If he has more carriages, the train must go slower." "It is the other way. To go faster he must have fewer carriages." "It might be that way if he were going downhill." "He ought to say 'slower' and not 'faster' " These are all passable.

The following would fail, "A long train is always better. "The engine pulls better if there is a lot of cars." "The weight of the carriages makes a train go faster." "It is not foolish. I have seen trains with a lot of carriages going very fast."

To detect absurd statement is a very useful and reliable test, calling for judgement and discernment. It is as sound a method of assessing common-sense as can be devised. Dull and heavy minds are likely to

accept absurdities without seeing anything wrong, but the normal mind is as a rule quick to detect the weakness involved in such statement. This power, which we mostly call the "Critical faculty" should be quite well developed at the age of ten.

- (10) To draw simple designs from memory.  
The following two designs have been used as standards in this test;



They may be shown on cards prepared by the drawing master. Say, "Here is a card which has two drawings on it. I am going to show it to you for ten seconds. Then I shall take the card away and ask you to draw what you have seen. Now look at both the figures carefully, and remember you have only ten seconds."

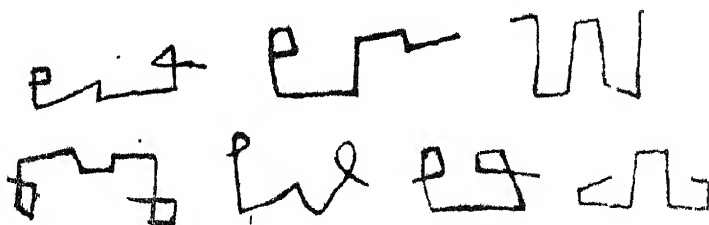
The child has pencil and paper ready, and is then shown the card for ten seconds. He should then start drawing at once when the card is taken away.

*Scoring.* The test is passed when one of the designs is drawn correctly and the other about "half correctly." By correctly we mean

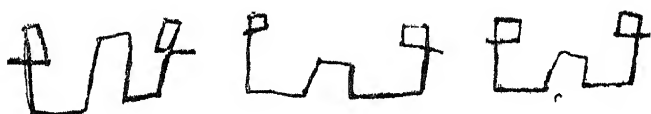


that the basic system of the diagram has been produced, although it may be irregular in execution and may vary in size. If some essential part is left out, we may call that "half correctly," provided that other features are right.

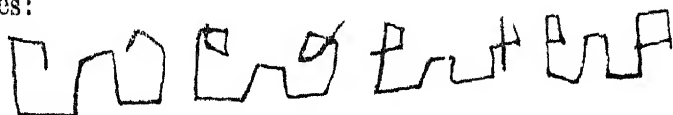
For example, the following would be counted as correct and a full pass:



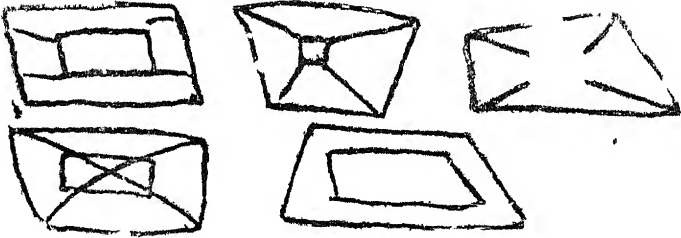
The following would be given credit as "half correct."



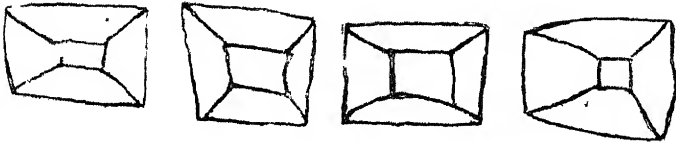
The following would be classed as complete failures:



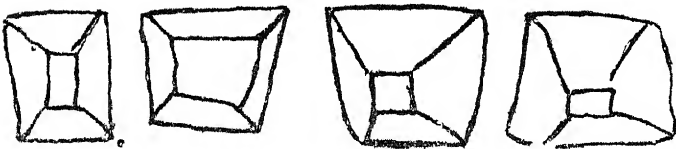
The following would be given full credit:



The next will be given half-credit:



And the following will fail:



This test calls for a power of rapid analysis, and of retentive memory. The analysis is necessary for memory alone would not enable pupil to retain and reproduce the impressions; the diagrams are too complicated for that. A skilful analysis of B design would give, (a) Outer rectangle. (a) Inner rectangle to the right of the centre. (c) The angles joined up. Unless the inner rectangle is shown right of centre, full credit

is not given no matter how well the design may be reproduced in other respects. A child does not make such a logical analysis as this, but without some kind of analysis is unlikely to repeat all the salient points.

- (4) To read and reproduce eight points from memory. Binet's selection, suitably modified with local colour, is:

Bombay, September 5th. Last night three houses were burned in the centre of the city. It took some time to put the fire out. The loss was fifty thousand rupees, and eleven families lost their homes. In saving a girl who was asleep in bed, fireman was burned on the hands.

- This should be printed on a card in heavy letters, and the various point of memory should not be underlined or marked in any way. Another copy suitably marked may be retained by the examiner for his private use.

Hand the card to the subject, and say, "I want you to read this slowly to me." See that he reads it aloud. If there are any words which are pronounced with difficulty, the examiner may pronounce them for the pupil. But do not pause for more than five seconds in such a case. Note all errors made in reading, such as leaving out a word, putting in another word, or changing the order of words. Note also the time taken in the reading.

The pupil has not been warned in advance that he will be asked to report what he has read, but when he has finished reading, take away the card and say to him, "Now I want you to tell me what you have read. Begin at the beginning and tell me as much as you can remember." If the subject repeats so much and then stops, say, "And any other thing? Can you remember any more?" But do not give suggestive questions such as "How many houses were burned?" "What happened to the fireman?" and the like.

Often a pupil will refuse to try, thinking that he is being asked to give a word-for-word report of the account. We then press him a little, and say, "Tell me in your own words as much as you can remember of it."

*Scoring.* The test requires for a pass that the pupil should read it in thirty five seconds will not more than two errors, and that the report should contain at least eight points. It is sometimes difficult to decide whether a memory has been reproduced correctly enough to be given full credit. Of course the examiner must not expect word-for-word reproduction, but must accept the substance or gist of the various points. But we cannot accept "a lot of house" as a substitute for three houses, or a lot

of money" instead of "fifty thousand rupees" or "a man" for "a fireman." But half credit may be given for something which is fairly near to the wording, as 'fifteen thousand rupees' instead of fifty thousand, of "seven families" instead of eleven.

This is a test in which practically all children have received enough school teaching to read the selection with few errors. If a pupil, however, is deficient in school attendance or instruction, this test would greatly increase in difficulty and would cease to be a test of intelligence. But it is also to be remembered that deficient or feeble-minded pupils often read quite well without understanding, and the test shows up such in their real weakness. The scope of their attention has been expended in reading, and memory has not been allowed to function. Thus the deficient pupil will not be able afterwards to report what he has read. The greater the difficulty met with in reading, the more unsatisfactory will be the report of "points of memory."

The passage in question may be taken to contain the following points. Bombay — Sept. 5th — Last night — three houses — burned — centre of city — took some time — put it out — loss fifty thousand rupees — eleven families — lost homes — saving — girl — a sleep — in bed — fireman — burned — on

lands. That is eighteen points in all, and only eight are required for a pass!"

- (5) Comprehension of situation requiring judgment. Forth degree, the difficulty being increased in comparison with the same test at the age of eight years. The questions are: (a) What should you do when some one asks your opinion about a person you do not know well? (b) What should you do when you are about to start an important piece of work? (c) Why should we judge a person more by his acts than by his words?

The method of examination is the same as in previous tests of comprehension. Any question may be repeated for the benefit of a pupil, but not changed in any way. No further explanation of the meaning of any sentence may be given.

*Scoring.* Two out of the three must be answered fairly sensibly. Here are some specimen answers from Professor Terman; (a) "When I am asked such a question, I would say I do not know him well enough to say." "I would say what I know, but no more." "I would say that I would rather not give an opinion." "I would say that he had better ask some one else."

All the above are satisfactory, but the following would fail: "I would say he is nice." "I would say I liked him." "I would say what I think." "Tell him to mind his own business." "I would promise to try to find out." "I wouldn't say any thing,"

With regard to (b) a wide variety is possible. Here are some, "I would think it over carefully." "I would make plans for the work." "Find the best way to do it." "Get all my arrangements made." "Ask some one for advice who knows all about this kind of work." "Think whether it would be possible for me to do it." "All these are satisfactory.

But the following would fail as responses to (b): "Promise to do my best." "Being at the beginning." "Get some one to help me." "Just start and do it." "Add up and find what it would cost." "See if I had time.

In (c) here are some: "Because actions are more important than words." "Because a man may talk well and yet do bad things." "Because sometimes people do not act as they have spoken." "Because it is not what you say but what you do that counts." "A man may be a thief and yet talk like a good man." "You can't believe what men say but there is no doubt about their actions." "Because sometimes a kind man talks in a rough way but does not mean it."

These are all good passes.

Failure to pass is usually manifested in meaningless or pointless answers, of which the following are typical, "Some people are not polite," "A man is polite if he speaks nicely," "Acts may be foolish," "We might not hear him talking," "The man does not know how to talk properly," "He may be good man but not good at talking." The last example comes near a certain sense, but is hardly satisfactory.

These three questions have been found to be of about the proper standard for ten years old. Such a question, used by Binet originally, as "Why should a bad act committed in anger be forgiven more readily than a bad act committed without anger?" is really more suitable for pupil of twelve years. They all call for simple decisions after judgement, and are true tests of natural intelligence.

- (6) To name sixty words. The pupil is asked to give any sixty words of his own choice. The examiner says, "I want to see how many different words you can give me in three minutes. When I say 'Begin!' you can start giving any words you like I shall count them. Any words will do, such as cloud; dog; chair; happy. Are you ready? Begin!"



The instructions may be repeated if necessary, but it is mostly unnecessary. Do not look keenly at the pupil and do not speak unless there is a pause of fifteen seconds at least. In that case say, "Go on. Any words will do." Repeat this after each long pause.

Some try to give words in sentence and to count them. This often applies to intelligent pupil, and they must be told that sentences will not do but that separate words are wanted. Try to note all the words given if possible, and to mark the stage reached at the end of each half minute. If the pupil is so rapid that words can not be written down, it is at least possible to mark each one by a pencil tick; words repeated may then be marked by a double tick.

*Scoring.* To pass the test, the pupil should give any sixty words, not counting repetitions, in three minutes. No credit is given, for example, if forty words are given in the first two minutes, if the final result falls below what is required. They must be real words, but any part of speech is accepted.

In scoring we only give credit for the number of words; but a thoughtful examiner will derive much information from the nature and variety. An unenterprising pupil will give a word and then dart

off to some quite different one. A thoughtful child, having given "black" will immediately seize on the idea of giving: green, red, yellow, blue, white. Etc., Similarly "pen" will suggest paper, pencil, write, ink, slate, rubber, and so on. Another child will hit on the name of as many objects as he sees in the room around him; it will depend then on how well the place is supplied whether that helps him. Some have tried to hold this test in a room as bare as possible; others ask the subject to do this with closed eyes.

Success in this test does not depend entirely on the extent of the pupil's vocabulary. Almost any English-speaking child has at least five thousand words at command by the age of ten; even average Indian pupils of the same age know over twelve hundred English words. It is the power to call up the words at command which count, and this comes from the variety of word-associations stored up. The test, with Indians, should obviously be held in the vernacular of the pupil.

Deficient children, with poverty of verbal associations, sometimes remain silent for fifteen seconds, or even more, without giving a single word. There is no stored thought in the mind which readily suggests a word, and the ability to express a thought readily in definite words is backwards. Sometimes nerves play a part in keeping a pupil silent; sometimes a pupil having launched on a group of words, as the colours,

is apt no remain too long thinking for more of that group when he would be better to abandon it and go elsewhere. Some search for important and significant words, and ignore the small ones. Even grown up people sometimes do poorly in this test because of unwillingness to give up every other consideration but speed. In spite of this, the results of this test usually agree well enough with that of the system as a whole, and it has proved its value. Moreover it is well to study the number of repetitions which a subject makes, because to repeat the same words unduly is usually a characteristic of the feeble-minded.

(Alternative Test I.) To repeat six number after hearing them once. The series of numbers which are: 3-7-4-8-5-9 and 5-2-1-7-4-6. The methods are the same as in the third test of the seven-year group, but two trials are given, one of which must be correct. If three trials are given, it becomes rather easy for ten years.

(Alternative Test 2.) To repeat sentences of from twenty to twenty-two syllables. The sentences set as standard test for this age-group are: (1) The mango tree makes a nice cool shade on the ground where the children are playing. (2) It is nearly half-past one o'clock; the house is very quiet and the dog has gone to sleep. (3) In summer the days are warm and fine; in winter it is sometimes cold.

The methods of testing and of scoring are the same as in Test Six of Age-Group Six.

Thus it will be seen that five years of mental growth have been required to pass from 16-18 syllables to 20-22. Average children of ten years usually pass in this test.

### TWELVE YEAR GROUP

- (1) Vocabulary Test. Forty definitions of words are required. As in former vocabulary tests, any rough definition which shows any meaning of a word is reckoned to be a pass.
- (2) Definition of abstract words. The words used in tests of English speaking children are: pity; revenge; charity; even; justice. These would be too difficult for Indian boys, without the same fluency in framing definitions in a strange tongue. They may be tested in corresponding words in their own vernacular, or in simpler abstract words like: hope; fear; love; thirst; haste. The method is simply to say, "What is hope? What do we mean by hope?" and the same with the other words. If the answer is not clearly given, then the examiner will ask the pupil to explain. Often it will be found that the answer includes

the word which is to be defined, eg. "Hope is when a person hopes for something." In that case, the next step is to say, "Yes, but what does it mean to hope for something?" This is the only kind of supplementary question that is permissible.

*Scoring.* To pass the test, three of the five words must receive a satisfactory definition. It need not be either a correct or polished definition, but it must show clearly that the meaning of the word is understood. An illustration which brings out the meaning may be accepted as a definition. For example, in the case of "hope," we would accept, "To have a wish for something." "To wish that something may come." "To be anxious for a thing." "It means that you want something that you have not got." "To long for what you want." But such answers as "To think hard." "To hope is no use." "To hope is to believe in a thing." "To think that you will get something," would not be passed.

Similarly in the case of "fear," we would accept, "To be afraid of something." "A feeling of being afraid." "To be frightened at some danger," "Fear is not being brave when something bad happens," all

would be given full credit, But such answers as "Trembling all over," "Not a good thing," "Being a coward," would not be given passing marks.

The word "love" is perhaps difficult because of its basically simple nature. We would accept, "To feel a liking for another person," "Love is the affection which we have for friends and relations," "Love is to like some other person very much" "If we love a person we would do anything for him," are all good passes, but "Love is a strong feeling," "Love is wishing for someone," or "It means that you want it," are not good enough.

"Thirst" and "haste" will be easily defined in terms of "wanting a drink" "being in a hurry" or going "quickly" Etc. The ability to define abstract words does not develop in the school-child before the age of 12. As a rule, ten-year-olds make little of this test. Any child knows what a particular case of fear, love or hope is; but the task is here to generalise and express the abstraction removed from the particular instance. A defective or border-line mind has not this power of generalising from the particular.

- (3) The Ball and Field Test (Superior Plan.)  
The same test is used again that we saw in Test I of the Eight-Year age group. But at this stage the elementary plans which were given credit are not accepted, and

only the highest type, or Superior Plan is passed.

(4) Broken Sentences. The following dis-  
arranged sentences are used:

TO THE WENT WE RAILWAY STATION THE EARLY MORN-  
ING AND WITHIN TWO HOURS OF LEAVING  
HE ASKED PAPER MY TEACHER CORRECT I MY.  
A DEFENDS DOG GOOD HIS BRAVELY MASTER.

The sentences should be printed in capitals, so  
that no indication is given of the first words of a sen-  
tence. No marks of punctuation are given. The  
approach is to say, "Here is a sentence which has the  
words mixed up so that they do not make sense. If  
the words are put in the proper order, they will form  
a good sentence. Look carefully and see if you can  
find how the sentence should read."

Do not suggest what the pupil should  
do, as this is particularly upsetting in this test. If the pupil  
can make nothing of the first sentence, read off the  
correct order of words slowly to him, pointing to each  
word as it is spoken. This may be done after he has  
had one minute to try. Then go on to the second  
and third sentences in turn, allowing one minute to  
each. Give no assistance, and if a wrong response is  
given, do not invite the subject to try again, or ask  
him to reconsider what he has said. Remain silent,  
but if the pupil should of his own accord give any

altered version, this may be accepted if right, and if given within the time limit of one minute. If the pupil seems to think that it is permissible to add other words, tell him that this cannot be allowed, and start him again.

*Scoring.* To pass, two out of the three sentences must be properly done within the time limit of one minute. So if it has been necessary to read the first sentence for the pupil, it is necessary for him to get the other two unassisted. The answers must be absolutely correct.

Sometimes a response may not be absolutely correct, but may make a sentence of a kind. Or the words may be in a bad order, which, nevertheless, bring out the meaning of the sentence. For example: in the first sentence, the obvious correct version is:

We went to the railway station in the early morning.

But it is obvious that the following:-

We went in the early morning to the railway station.

In the early morning we went to the railway station.

are equally good and get full credit. Such a version as:



To the railway station in the early morning  
went we.

might be found in certain kinds of writing, but can  
only be given half credit here. The same half credit  
might be given to:

To the railway station in the early morning  
we went,

while the following:

We went early to the railway station.

We went to the railway station in the morn-  
ing.

Early we went to the railway station in the  
morning.

are distinct failures.

With the second sentence, the only satisfactory full credit version is "I asked my teacher to correct my paper."

*Half credit might be given to:*

"My teacher I asked to correct my paper."

but anything else is sure to be a failure.

In the third sentence, we must expect:

A good dog defends his master bravely  
 or: A good dog bravely defends his master

*Half credit may be given to:*

A dog defends his good master bravely.

A good master bravely defends his dog.

since the sense, although grammatically, is not what would be currently understood from the respective parts of man and dog.

*The following:*

A dog defends his master bravely.

A bravely dog defends his master.

A good bravely dog defends his master.

must all fail.

This is a good test of intelligence in the true sense of the term. It is in no sense dependent on previous instruction or practice, but depends on the ability to keep up the connected idea of framing the proper sentence out of the mixed fragments, of trying and rejecting unsatisfactory combinations and of submitting the finished effort to a final judgement. It is certain that the percentage of successes increases steadily with age.

- (5) Interpreting Fables and Moral Stories.  
 The following fables well-known in many

English Readers, have been selected for use.

(a) HERCULES AND THE WAGGONER.

A man was driving his wagon along a country road, when the wheels suddenly sank in a deep rut. The man did nothing but look at the wagon and call loudly on the God Hercules to come and help him. Hercules came up, looked at the man, and said, "Put your shoulder to the wheel, my man, and whip your oxen a little." Then he went away and left the driver.

(b) THE MILKMAID AND HER PLANS.

A milkmaid was carrying her pail of milk on her head, and was thinking to herself thus: "The money for this milk will buy four hens; the hens will lay at least a hundred eggs; the eggs will produce at least seventy-five chickens; and with the money I get for the chickens I can buy a fine new dress. She looked down at herself, trying to think how she would appear in her new dress; but as she did so the pail of milk slipped from her head and fell on the ground. So all her imaginary schemes perished in a moment.

(c) THE FOX AND THE CROW.

A crow, having stolen a piece of meat, perched on a tree and held it in her beak. A fox who saw her wished to get the meat, and so said to the crow: How

beautiful you are! and I have heard that the beauty of your voice is as fine as that of your feathers. Will you not sing for me, that I may learn whether this is true?" The crow was so pleased that she opened her mouth to sing and dropped the meat, which the fox immediately ate.

(d) THE FARMER AND THE STORK.

A farmer set some traps to catch cranes which had been eating his seed. Along with them, he caught a stork. The stork, which had not been eating seeds, begged the farmer to spare his life, saying that he was a bird of good character and not at all like the cranes, and asking the farmer to have pity. But the farmer said, "I have caught you among the thieves, and you must die with them."

(e) THE MILLER, HIS SON, AND THE DONKEY.

A miller and his son were driving a donkey to the town to sell the beast. They had not gone far when a child saw them and cried out, "What fools these fellows are to be walking when one of them might be riding." On hearing this the old man made his son get on to the donkey, while he himself walked. Soon they met some men. "Look!" said one of them, "see that lazy boy riding while his old father has to walk." On hearing this, the miller made his son get off, and he himself rode on the donkey's back. Soon after they met some women, who shouted out, "What

a lazy old man, to ride in comfort while the poor boy can hardly keep company with you." At once the miller took the boy up behind him, and they both rode on the donkey. As they came to the town, a man cried, "What cruel fellows! you are more fit to carry the poor donkey than he is to carry you." "Very well," said the miller, "we will try." So they both jumped down, tied the donkey's legs with rope, and carried him with a long pole. But as they crossed a bridge over a river, the donkey kicked off the ropes, fell into the water, and was drowned.

The stories should be given to the pupil in the above order. The examiner will say to him, "You know what a fable is? It is a little story which is meant to teach us a lesson. I am going to read a fable to you. Listen to it very carefully, and when I have finished I shall ask you what lesson the fable teaches." After reading the story, say, "What lesson does that story teach?" Take down his answer word for word, and then go on to the next fable in the same manner.

As far as possible, say nothing either of praise or blame till all the stories are finished. In particular, do not say that anything is bad, no matter how bad it may be. Some pupils may ask, "Did I do that one all right?" It is enough to say, "You are getting on quite well." Offer no hints or suggestions whatever. The test must be uniform for everybody. The only

exception is when an answer is given which is not quite clear, and which may contain the germ of understanding. In such a case, say, "I am not quite sure what you mean. Try to explain to me what you mean."

*Scoring.* Two points are given for a sound answer showing that the basic lesson of the story has been grasped, though possibly not expressed with grace or appropriateness. One point is given for an answer decided to merit half marks. The whole test is passed if a score of four points is earned on the five stories. Two kinds of answer may be given half credit, either fairly plausible interpretations which are not quite the correct one, or correct answers which grasp the point involved but only state it in terms of the particular story, and fail to give it as a general principle of life. Ordinary faults of expression do not count, but the only real indication for the prospective examiner is the study of some answers collected in some years of experiment.

(a) HERCULES AND THE WAGGONER.

*Score of 2 marks.* "God helps those who help themselves." "Do not depend on others for help." "Help yourself before calling out for help." "This

teaches us that we should rely on ourselves," and similar answers to the same point.

*Score of 1 mark.* "The man ought to have tried himself first." "Hercules wanted to teach the man to help himself." "The driver was at fault for depending on others." "The man was too lazy and should have tried himself before calling on Hercules."

*Failures.* "Teach us to look where we are going." "This is to teach us not to ask for help when there is no one to help us." "This teaches us not to get into the mud." "This teaches us not to be mean like Hercules." "The driver should have done what Hercules told him."

(b) THE MAID AND THE EGGS.

*Score of 2 marks.* "Teaches us not to build castles in the air." "This teaches us not to count chickens before they are hatched." "This shows us that it is bad to plan too far ahead." "Don't count on the second thing till you have done the first."

*Score of 1 mark.* "It teaches us not to have our minds on plans when carrying milk on the head." "She was building castles in the air and so lost her milk." "See was planning too far ahead." These are fairly correct, but have not been made general in application to life, which is the thing required. Such as "Teaches to keep our mind on what we are doing"

and "Teaches us not to want things but to be content" are general enough, but not accurate and so can only get half credit.

The following are failures: "Teaches us that money does not bring happiness," "Not to think about getting fine clothes" "Teaches us not to waste things," because they are not the lesson of the fable. On the other hand, such as "Teach us not to carry milk on the head," or "Teach us not to waste milk" are failures because crude and pointless. Some will manage no more than an effort to repeat the story, and can be given no credit for this

(c) THE FOX AND THE CROW.

*Score of 2 marks.* "Teaches us not to listen to people who flatter." "It is not safe to believe people who flatter us," "We should suspect people who make fine speeches to us."

*Score of 1 mark.* The correct idea, but in terms of the story rather than general terms, eg. "The crow was so proud that she lost her head." "The crow listened to flattery and so fell into trouble," "Teaches us not to think we can sing when we cannot." The following have some point, but do not get special point of the fable, "Teaches us not to be proud," "Teaches us that pride goes before a fall." "To be on guard against those who are our enemies."







*Failures.* "Not to mix with people you don't know," is an incorrect deduction from this fable. "Not to be selfish" and "To take care not to lose your food" are also too poor to get any marks. The same applies to "Teaches us to be honest," and "Not to listen to bad talk." Such as: "The crow should have just shaken her head" and "It served the crow right for stealing the meat" are also valueless comments.

(d) THE FARMER AND THE STORK.

*Score of 2 marks.* "You are judged by the company you keep." "This teaches us to keep away from bad companions." "If you go with bad people you will be thought to be like them." "Teaches us to be careful in choosing friends."

*Score of 1 mark* "The stork should not have kept company with the cranes." "Teaches him not to mix with robbers." "This tells us not to go with others."

*Failures.* Incorrect deductions, such as "Teaches us not to steal." "Not to tell lies." "Teaches that it is no use giving excuses." "Teaches not to harm animals that do no harm." "We should not blame people for things they have not done." "This taught the stork not to steal." "This should teach us not to be hasty in judging people."

(e) THE MILLER, HIS SON, AND THE DONKEY.

*Score of 2 marks.* "When you try to please everybody, you succeed in pleasing no body." "Don't listen to too much advice, but think for yourself." "Teaches us to have a mind of our own." "Have full confidence in your own opinions."

*Score of 1 mark.* "Never take any one's advice." (A very sweeping conclusion.) "Don't take foolish advice." "This shows that people don't always agree." "They were fools to listen to everybody." (The idea is correct but it is not generalised.)

*Failures.* "Teaches us to do what people tell us." "Teaches us not to be cruel to animals." "We should not put too heavy loads on animals". "We should be kind to old people." While the final three are true enough, they are not derivable from this particular story. Such crude attempts as "Teach us not to carry the donkey," and "The men were too heavy for the donkey," are obvious failures because of crudeness and lack of logical deduction.

The "fable" test is an excellent means of arriving at an estimate of the intelligence of pupils. The scoring is not so straightforward as in many other tests, but study of the quoted examples, along with practice and common-sense, will enable the examiner to decide whether the true point of the fable of the

moment has been grasped, and, what is more important, taken out of its particular or local setting and given general application. It is thus a test calling for a criticism of motives which underlie all human acts and conduct, for the motives attributed to animals and birds in the fables are human in the Aesop method. Thus we have a clue to the social and moral consciousness which should be developing in the child. The child who is sub-normal in this respect shows unfitness for his place in society and his share of public life; if the degree of unfitness is great enough, he is possibly a case for specialist or institutional treatment. We saw in our early chapters that offenders against the morality of social life are not intelligent rebels, but rather weak-minded persons who have failed to grasp the moral principles involved in the restraints of law. At the age of twelve, a definite sense of what is right or wrong in conduct should have been formed, and pupils of this age are quick to resent unfair play in sport or mean acts in playground activities. To the feeble of mind, such unfair acts bring no appropriate reaction and there is no perceptible unifying principle of conduct in school life. That is why this "generalising" test is one of the most valuable in the mental testing of young law-breakers and potential criminals. Terman quotes the responses of an 18 years lad who had come within the reformatory activities of the law for minor offences:

- (a) She was thinking about the dress, and spoiled the milk. Teaches selfishness.
- (b) He wanted to help the oxen out.
- (c) That's how the fox got his name. Does'nt teach anything.
- (d) Try to help the stork out of the field.
- (e) They were all big fools and unkind to the donkey.

It does not require a psycho-analyst to see that a person with such poverty of ideas is not likely to become a moral or law-abiding member of society.

The test depends very little on previous instruction. It will, of course, be advisable to have a wider range of tales lest the few used too often become well known. But there are plenty available, and in any case it is not certain that a pupil is likely to remember and repeat a tale embedded in the large amount of various tests which he undergoes. In any case, many a pupil has been found to be quite familiar with a fable, so as to be able to repeat it correctly, and yet to be incapable of deriving its general lesson.

- (6) To repeat five numbers backwards. The sets of numbers used are: 3-1-8-7-9. 6-9-4-8-2 and 5-2-9-5-1







The method of applying and also of scoring is the same as for Age Groups seven and nine.

- (7) Interpretation of pictures. We saw that in other age groups, namely three and seven, we used pictures for the sake of eliciting the names of objects, and later a little description. The same pictures are used now, with the difference that a more advanced interpretation of the picture is required from the higher age. The same address is used: "what is shown in this picture? What is it about?" This does not ask for either description of objects or fuller explanation, but leaves it to the pupil's natural understanding. But if this fails to bring a natural response in three out of the four pictures, we give a further trial by asking, "Explain this picture." Some who fail to respond the first time will be enabled to do so then. If the attempt is too brief and hence difficult to judge, go a little further and say, "Go on!. Explain what you mean."

There should be no word of either approval or dissatisfaction till all the pictures have been dealt with. An unsatisfactory response is given at the start, and met with the comment, "That is good," then the pupil will not try to give any better in the rest of the test.

*Scoring.* Three out of four pictures must be explained in a satisfactory manner. That is, it must be reasonable and logical, though perhaps not exactly what the examiner was thinking of. For example, in the home scene, which shows a table with preparation for a meal, there is a child who is weeping and a woman lifting her up; an overturned pot lies on the floor. The following answers might be given full credit: "The child has spilled something and is being scolded" "The baby has hurt herself and her mother is comforting her." "The baby is crying because she is hungry and her mother has nothing to give her." "The little girl has been naughty and is being punished." "The baby has upset the pan and her mother is afraid she has burned herself."

The following are unsatisfactory: "Baby is crying and her mother is looking at her." (Elementary and devoid of imagination.) "There is a little girl crying and her mother and a dish on the table" (This is mere enumeration of objects, unsatisfactory at this age.)

In the river scene, a richly dressed man is in a boat which is rowed by two boatmen. By his side is a lady in a splendid sari. The following attempts would be given full points: "The raja and his wife have gone out for a sail to see the river." "Perhaps

the roads were covered with water and they could not travel by motor-car." "Their house is in the jungle by a river, and they are going to the railway-station." "They are going to a temple and have to cross the river by boat." The following responses will not be passed: "They have gone out to shoot, or to catch fish." (because the style of dress and the absence of guns, fishing rods, Etc. makes this interpretation most unlikely.) "Two men are rowing a raja and his wife on the river." (This is only description, and too elementary for this age-group.)

The post-Office scene will also lend itself to a number of different interpretations. For example, "It shows some men in a post-office, They have come to post their letters, and are laughing and talking with each other." "It is a post-office. One man has told another a funny story and he is laughing at it." "It is the village post-office, and some of the old men having a talk about village affairs." Not satisfactory are "It is a post-office. There are some men in it." "This is a post-office. Two men are standing there and two are sitting and talking." These are purely descriptive, and while acceptable from younger pupils are not up to the twelve-year standard. That is the standard for the examiner to keep before him; there must be an idea of the motives and action of the picture. For this very reason, the picture used must show human personality in such an environment that action is suggested. Picture of still life

would not be suitable. A great deal depends on the type of picture used, and it is very easy to make this test too easy or too difficult by using unsuitable pictures.

The ability to interpret pictures is not a mental gift which comes suddenly at twelve years, but it is a combination of powers which are developing from the age of five. Some response might be expected at any age from five onwards, and it is the task of the examiner to decide by suitable experiment and observation, the response which he has to expect at the age of twelve.

11

- (8) Giving similarities in three things. The test is the same as number 4 of the Eight-year group. The following sets of objects are used: (a.) snake; cow; sparrow. (b.) book; teacher; newspaper. (c.) wool; cotton; leather. (d.) knife; anaconda; piece of wire. (e.) rose; potato; tree.

A little urging and repetition may be used in order to draw out a response, but not hints or suggestions as to the underlying similarities.

*Scoring.* To pass the test, three responses should be satisfactory out of the five. Any real point of similarity may be accepted provided it is true in fact, though perhaps not

the most essential point that we should first think of.

The following kinds of failures will be met with: giving similarities between two instead of three things; many give differences instead of similarities; some give similarities which do not exist or are hopelessly far-fetched; some, though not many, do not respond at all. A number of responses may leave the examiner in doubt. Such indefinite statements as "All are made of the same thing" must be followed up by asking, "In what way are they all useful?" and "What is this thing of which they are all made?" But such supplementary questions are only allowed in the case of need to clear up a vague answer which suggests that there may be some understanding behind it. Here are a few typical answers, for the benefit of the examiner testing for the first time:

(a) snake; cow; sparrow.

*Passing answers.* All are animals. All live on the land. All have blood. All are living things. All breathe air. All have some intelligence.

*Failing to pass.* All have legs. All are dangerous. All feed on grass. All are afraid of men. All walk on the ground. They all can bite.

(b) book; teacher; newspaper.

*Passing answers.* All teach us. You learn from all of them. They all give you information. All help in your education. All are good friends. (Pressing only if pupil can explain further.)

*Failing to pass.* All give you the news. A teacher speaks but a book and a newspaper have writing. All use words. The are not alike.

(c) wool; cotton; leather.

*Passing answers.* All are used for clothing. We can wear them all. All grow. (Must be cleared up by further questions.) All are sent to the factory to be made into things. All are of value. (Provided supplementary question to bring out explanation of the value.)

*Failing to pass.* All come from plants They all grow on animals. All of them will burn. All are soft.

(d) knife; anna; piece of wire.

*Passing answers.* All are made of metal. All come out of mines. All are made of hard substances.

*Failing to pass.* All are made of iron. (or copper, &c.) All are made of the same metal. All can cut. All will bend easily. All come out of shops. All of them are small.

(e) rose; potato; tree.

*Passing answers.* All are found growing from the ground. All are kinds of plants. All have leaves and roots. All have to be planted.

*Failing to pass.* All of them are pretty. All of them give fruit. They all have pretty flowers. All of them are valuable (or useful.) This last may be accepted if a common point of value or of use can be stated.

#### FOURTEEN YEAR GROUP

- (1) Vocabulary. Fifty Definitions of Words. This is as the Ten and Twelve year groups, with the difference that at fourteen years of age, a fairly intelligent kind is required for fifty words.
- (2) Induction Test. To formulate a rule from observed facts. For the test, have six sheets of plain paper about 9×11 ins. Take the first sheet, after saying to the pupil, "Watch carefully what I do." Fold the sheet in the middle, and in the middle of the folded edge tear or cut out a small piece. Then ask, "How many holes will be in this sheet when I open it again?" Practically all pupils answer "one" without much delay. What-ever answer is given, unfold the sheet and show that there is only one hole. Then take a second

sheet, fold it once and say, "When we folded this way and took out a piece, it made one hole. This time we shall fold it a second time and see how many holes there will be." Fold the paper again, this time in the opposite direction, tear a piece out of the folded side, and ask how many holes there will be in the paper when it is unfolded. Note down answer given, then unfold the paper and allow the pupil to see for himself. Sometimes the answer is wrong, and the pupil is surprised to see two holes. Now go on to the third sheet. Say, "When I fold it once, there is one hole. When we fold it again, there are two holes. Now let us fold it a third time and again tear out a piece. How many holes do you think there will be when I unfold it this time?" Note down the answer given, unfold the paper, and show there are four holes.

Go on in this way through sheets four, five, and six, making an extra fold in each time. In folding each sheet, impress on the pupil the result gained in the previous sheets, viz. "When I folded it once, there was one hole; when I folded it again, there were two holes, when I folded it once more, there were four holes; when I folded it again, there were



eight holes, and so on. What will be the number of holes if I fold it once more?" Avoid saying, "When I folded it once...twice.....three times, as this enables the pupil to double the number of folds, whereas what is wanted for him to double the number of holes in the previous sheet.

*Scoring.* The test is to grasp the rule of an arithmetical progression 1—2—3—4—8...and the test is passed if the answer shows that the rule has been grasped before the sixth sheet is reached. The first five answers may be wrong, but if the sixth is correct and the rule can be stated, that constitutes a pass. But even if all the answers are given correctly, the rule is not to be asked for until all the six steps have been completed. A rule must not be mentioned before then. Of course if a lad sees that it will always be twice the number in the previous step, and volunteers the information, there will be no need to go on with the remainder of the test.

This has been found a true test of intelligence. The brighter pupils see the rule after a few steps; the dull ones require further demonstration and stumble on it with difficulty at step five or six. It is little influenced by school instruction and has the merit of arousing interest. It is a matter of how long it takes a

pupil to notice that as each sheet is unfolded it contains twice the number of holes that were in the previous sheet, and to see that this constitutes a fixed rule.

- (3) To repeat seven numbers. The same as in Age-group for ten years. Now only two sets are used, and one must be repeated without any mistake. The series are: 2—1—8—3—4—3—9. and 9—7—2—8—4—7—5. The pupil is not informed beforehand how many numbers are to be repeated. Experiment has shown that if more than two sets are given, the test is too easy for fourteen years.
- (4) Problems of fact. Say to the pupil: "I shall read something to you. See if you can understand it." Then read the following three problems, slowly and with emphasis where required. After each one stop long enough to give time for an answer: (a) A man walking through the jungle suddenly stopped, very much frightened. He had almost placed his foot upon a — what? (b) My neighbour has been having some visitors this morning. First there came quickly to his house a doctor, then a lawyer, then a priest. What do you think was happening there? (c) A villager coming to town for the first time

saw a man riding along the street. He said, "That man is lazy. He walks sitting down." What was the man riding upon that caused the villager to say this?"

No supplementary questions of any kind are to be allowed to elicit the correct answers. The examiner must wait in silence for whatever answer the pupil may give. At this age, silence and hesitation are unlikely. If the pupil requests a second reading of the problem, however, this may be given.

*Scoring.* Two out of three answers must be prompt and reasonable. The following examples will show what constitute reasonable answers:

- (a) *Passing.* A snake; a cobra; a scorpion.

*Failing.* A bird's nest; a stone; a piece of glass; a knife; a mouse; a rabbit.

- (b) The usual answer is, "Some one has died." In general, the reasoning is that the doctor came to attend the sick person, the lawyer to make his will, the priest to arrange the funeral ceremony. This arrangement works out in countries with a certain type of social and legal background; in India the coming of the lawyer is not so well and commonly understood. However there

may be other reasonable explanations. A young pupil, a student of eugenics, is quoted by Terman as answering. "A marriage; the doctor came to examine the parties and see whether they were fit to marry, the lawyer to arrange the marriage settlement, and the priest to conduct the marriage ceremony. While there is little likelihood that all these would happen on the same morning, yet the ingenuity of reasoning earned a pass. A number of answers will account for the presence of two of the visitors, but not of the third. In India, as already mentioned, it is the lawyer who is most usually the stumbling block. Such an answer as, "A man was sick and in trouble. The doctor came to cure him and the priest to help him out of his trouble," is fairly reasonable, but a doubtful pass. Terman would not pass it for America; we think it might be given full credit in India where the legal system is different. Again, "Some one was sick. The lawyer saw the doctor go in, so came to collect his own money. Then the priest came to inquire how he was," is certainly evidence of ingenuity and logical sequence, if a little far-fetched.

(c) What the man was riding on?

*Passing* Any form of answer which gives "a bicycle."

*Failing.* Any other answer, — a donkey, horse, carriage, a wheeled chair, etc.

This is another variety of what we called "the completion test," in which part is given and the whole has to be made up. Different exponents have agreed that it is a good type of test, but some have disagreed with the suitability of the problems, particularly the lawyer element in (b) as not likely to be generally known even by intelligent children. I have no doubt that problems with the necessary Indian colour and background can be worked out to serve instead of (b)

(5) Arithmetical reasoning. The following problems, printed on card, are shown one at a time to the examinee. He has to read the problem aloud, and, still retaining the card, give the answer without the use of pencil or paper.

- (a) If a man earns eighty rupees a month and spends sixty five rupees a month, how long will he take to save seventy five rupees?
- (b) If two pencils cost eight annas, how many pencils can you buy for four rupees?
- (c) If cloth costs fifteen annas a yard,

what will be the price of seven feet of cloth?

Just one minute is given for each problem, but the pupil should never be urged to hurry up. While he is solving one problem, the others should not be visible to him lest they distract attention. If an answer is given wrongly, do not ask him to reconsider it or to try again. The single exception is that, in problem (c) if it appears that "yard" has been read as "feet", he may be asked to read the problem over carefully and explain his reasoning.

*Scoring.* Two of the three problems must be solved correctly, each within one minute.

At first, many may offer the criticism that these are tests mainly of proficiency in school arithmetic. The pupil uses, no doubt, knowledge which he has acquired in school, but this knowledge is possessed by all, including many who are not in the least able to apply it. The successful pupil, therefore, is he who can apply his knowledge readily and correctly to practical problems, and if this ability is not furnished by native intelligence it cannot be given by any from of school training. Even the feeble-minded can be taught to add, subtract and multiply; but they will be found unable to decide which particular operation a particular problem requires. In every way, results show that this is a distinct test of intelligence.

- (6) Reversing the hands of the clock. The method is to say to the pupil, "Form in your mind a picture of what a clock is like when it is six twenty-two o'clock, that is twenty two minutes past six. See where the large hand would be and where the small one would be." Boys of twelve to fourteen years usually agree that they are able to make this mental picture. Then say. "Now if the two hands of the clock change places, so that the large hand goes into the place of the small one and the small one goes where the large hand is now, — what time will it then be on the clock?"

- Repeat this test with the hands at 8. 10. i. e. ten minutes past eight. and at 2. 46. fourteen minutes to three.

The pupil must have no means of looking at a watch or a clock, and he is not allowed to help himself not by drawing the position of the hands of a clock. It is all a mental test. If answer is not given correctly to any one question within two minutes, then that part is a failure

*Scoring* To pass, two of the three must be solved, and answers will be considered correct which are within the following limits: the

first, if the answer is between 4. 30 and 4. 35; the second if the answer is between 1. 40 and 1. 45; and the third if the answer is between 9. 10 and 9. 15.

This test requires voluntary power of visualising and of working from mind pictures. Weakness of the power to visualise keeps many from succeeding. School instruction seems to have little part on the percentage of passes. But it may be necessary to change the position of the hands from time to time, as this test leads itself to cribbing and imparting of the correct answers to others. But all times are not the same; experience shows that the 2. 45 test yields twice the percentage of failures as the other two positions.